

SKILLS & ACCOMPLISHMENTS

Unique skill set including lithium battery and ultracapacitor R&D, application engineering, sales, marketing, team building and business management, with a complementary graduate education in science and business.

- 37 years in the battery industry; managed team that developed and commercialized the first lithium-ion battery in North America in the early 1990's.
- Expert witness for 50 lithium-ion related cases including IP, product liability and commercial. Declarations: 16; Depositions: 5
- Cell assembly, performance and abuse lab installation. Procedure development and training.
- Assembled and led research, product development, testing and application engineering organizations; Established international sales and technical marketing teams
- Extensive Asian experience: worked for NIO, Mitsui and NEC with significant travel to Japan, Korea and China; subcontracting and joint R&D in China; audited and maintained relations with material suppliers and subcontractors throughout Asia.
- Leading edge of battery and supercapacitor technology resulting in many invitations to speak at major U.S. and international conferences. Over 45 presentations and publications to date.
- Strong presentation; reporting; organization (personal and team); and training skills.

PROFESSIONAL EXPERIENCE

Lithiumion Expert Services, LLC

Consulting in all areas of lithium-ion batteries and supercapacitors (since 2000), including expert witness for IP and commercial litigation, product liability incidents (i.e. e-cigarettes, medical devices, portable devices, stationary systems and vehicles). Corporate patent and technology due diligence. New technology development assistance. Failure analysis including battery autopsies, performance and safety/abuse testing. Cell assembly, performance and abuse lab design, installation and training. Business/technology planning, go-to-market strategies.

2021 to 2022 – Joby Aviation

Cell Supplier Lead

Responsible for lithium-ion cells and technology at Joby, an e-VTOL company. Cell and supplier qualification. Working with developers of new cell material and component technology.

2020 to 2021 – Feasible, Inc. (now Liminal)

Head of Product

Led development and commercialization of non-invasive ultrasound testing for battery cells.

2017 to 2020 - NIO, Inc

Principal Cell Specialist

Responsible for lithium-ion cells and technology at NIO, an autonomous EV company developing from the ground up a fully autonomous vehicle. Support the battery pack team. Cell and supplier qualification. Development of new technology for use in NIO EVs.

2014 to 2017 Iontensity, LLC

President and Founder

Founded Iontensity to fill an important niche in the lithium-ion industry. Hired a team of scientists, engineers and technicians and set up an R&D Model Plant Facility to assemble electrodes and

cells, and perform testing. Won two government DOE contracts totaling \$1.4M. Transferred technology, trained and assembled cells for four multinational companies. Contracted with multiple start-up companies to support their efforts to bring new materials to market. Battery qualification and failure analysis for OEMs.

2008 to 2014 Leyden Energy (previously Mobius Power Inc.)

VP R&D

Responsible for all R&D efforts, technology roadmap and personnel in the development of novel lithium-ion cell and battery technologies: High Power (LMO/LTO); High Energy (Si anode); and Non-Flammable Electrolyte.

Assembled strong R&D and Engineering teams through a combination of hiring experienced scientists, engineers and technicians and mentoring new engineering graduates.

Worked directly with consumer electronics, industrial and EV customers (North America, Asia and Europe) to customize chemistry and cell/pack designs. Led development of 12V/48V batteries for industrial and micro-hybrid EV applications.

Audited many Chinese factories for material supply and subcontracting lithium-ion cell and pack manufacturing. Responsible for technology transfer for manufacturing.

Designed and implemented a Performance Testing Lab with 1800 automated testers and a Safety/Abuse Testing Lab capable of UN/DOT and UL1642 testing.

Won CEC (California Energy Commission), three DOE, and four USABC contracts worth \$16M. PM for USABC contracts.

Responsible for IP portfolio. Prepared and submitted nine U.S. and four international patent applications. Five U.S. patents granted.

2005 to 2008 UNCAP, LLC

CTO, VP of Marketing and Founder

Founder of UNCAP, LLC, a U.S. based ultracapacitor company. Designed and developed a nickel based aqueous asymmetric ultracapacitor. Built 14V and 28V, 195kJ modules for use in diesel engine starting in cold weather, no-idle solutions and Silent Watch (military). Designed ultracapacitors for lead customers in uninterruptible power supplies. Developed an Excel model of the cell components to predict performance. Prepared seven patent invention disclosures. Also responsible for administration and financial management.

2004 to 2008 Mobile Power Solutions

CTO

Set up a battery and ultracapacitor testing laboratory. Designed equipment for UL and DOT/UN transportation testing. Trained personnel. Designed custom performance and safety test programs and oversaw technical elements. Provided expert opinions on performance, safety, abuse, shipping, packaging and recycling regulations for batteries. Audited Tier 1 China cell manufacturers for large U.S. consumer electronics OEM.

2003 to 2008 VoltSource, Inc.

President and Founder

A private consulting firm in the field of batteries, supercapacitors and associated industries, specializing in product (cell and pack level), IP development (prepared ten patent disclosures for one customer), market, applications and business development, market assessment, sales, energy source selection (developed three web based battery and ultracapacitor design programs), product testing and qualification, environmental, transport and safety issues, and battery-related investment and legal work.

2000 to 2003 Cooper Electronic Technologies, PowerStor Products, Dublin, CA

Director of Sales and Marketing

Responsible for international sales and marketing, product/market development and application engineering. Identified / researched target markets enabled by this new technology. Designed and developed, evaluated and qualified ultracapacitors based on customer / application requirements.

Launched five new product lines including various cylindrical (0.22F ~ 100F) devices, higher voltage (5V ~ 20V) modules using balancing circuitry, ultra-thin flat low ESR devices using foil-polymer laminate packaging and very high capacitance (> 500F) cylindrical devices.

1996 to 2000 PolyStor Corporation, Dublin & Livermore, CA

Director of Sales and Marketing

Assembled customer service, application engineering, and sales and marketing organization.

Co-developed BB-2590/U Lithium-ion battery under US Army CECOM development contract.

1985 to 1996 Moli Energy Limited, Vancouver, B.C. Canada

Manager, Sales & Marketing

Manager of Product Development

Manager of Product Evaluation

Various Team/Project Leader Positions Research Technologist / Scientist

Cell, product, application and market development of Moli Energy's Lithium Battery Technology. Planned and managed various cell and battery development and product evaluation projects to successful completion, including development of first lithium-ion cell in North America.

Researched new cathode, anode and electrolyte materials for lithium metal and lithium-ion.

Co-developed the first BB-2847 Lithium-ion battery for U.S. Army CECOM.

Assembled a new Sales and Marketing team following development of lithium-ion 18650 cell.

EDUCATION

1993	Executive MBA	Simon Fraser University	Vancouver, BC, Canada
1989	MSc (Chemistry)	Simon Fraser University	Burnaby, BC, Canada
1985	BSc (Chemistry)	Simon Fraser University	Burnaby, BC, Canada

PATENTS

US 8,221,915 High performance lithium or lithium ion cell, July 17, 2012
 US 8,465,871 Electrochemical cells with tabs, June 18, 2013
 US 9,263,731 High performance lithium or lithium ion cell, February 16, 2016
 US 9,343,745 Surface passivation of active material particles for use in electrochemical cells, May 17, 2016
 US 9,350,017 High performance lithium or lithium ion cell, May 24, 2016
 US 10,538,437 Liquid treatment using capacitive systems, January 21, 2020
 US 10,756,391 Method and system for secondary internal current mechanisms for a lithium-ion cell, August 25, 2020
 US 11,127,995 Lightweight thermal adsorption structure for lithium-ion cell module, September 21, 2021
 US 11,205,809 Early detection of thermal incident in battery pack, December 21, 2021
 US 11,233,272 Zero flammability electrolyte for lithium-ion cell, January 25, 2022
 US 11,431,046 Lithium-ion cell using aluminum can, August 30, 2022

PUBLICATIONS & PRESENTATIONS

Over 45 publications, seminars and presentations, including keynote, plenary and invited.