

# Leigh Christie

P.Eng, B.A.Sc. Engineering Physics, M.Sc MIT

## CURRICULUM VITAE 2018

In total Leigh has 14 years experience as a professional engineer and 12 years experience as a lab-builder and team-builder. Leigh Christie is the Director of the Isobar NowLab for North and South America. Leigh and his teams have built 5 hardware and software “NowLabs” for Isobar and is responsible for the research output for each location. Past projects include a photorealistic vacation simulator VR experience, the world’s first roomscale VR music video, a wireless charging portable power solution, a low cost ultra-high resolution iris scanner, a mood measurement IoT device, and a soccer training simulator. Prior to Isobar, Leigh obtained his masters in 2014 in the Art, Culture and Technology program from MIT. 10 years prior to that, Leigh received a degree in Engineering Physics from the University of British Columbia. Leigh has spent the better part of his career as a hands-on designer, hacker, and fabricator who both manages large teams of engineers and designers as well as actively designs and fabricates prototypes. Leigh is best known for creating the Mondo Spider, an 8-legged 2,000lb electro-mechanical walking machine; it is the first of it’s kind in the world. Leigh also engineered the first fully functional prototype for the Copenhagen Wheel, an all-in-one electric bicycle wheel that was spun out of MIT. Also, as the first engineer to work for Rapid Electric Vehicles in Vancouver, BC, Leigh gained substantial experience leading a team to develop two generations of electric vehicle systems and components. With extensive experience in top down CAD design, systems engineering, and with a strong grasp of electrical engineering and firmware, Leigh has proven his abilities to take a plan from a concept to a working prototype and create viable final products. In addition to de-risking engineering projects, Leigh also specializes in recruitment and team building and has done so far nearly every project he has ever worked on. In his spare time, Leigh regularly designs and invents things and holds 3 patents including one for a folding concealable skateboard. Leigh is a founder of MistyWest Engineering (a 25-person engineering firm in Vancouver), as well as a large-scale robotic-sculpture research lab called the eatART Foundation. Leigh has helped raise \$12M in funding for past clients and friends and has helped find and close over \$6M worth of business for Isobar and MistyWest. Leigh regularly mentors entrepreneurs and engineers on how to become better at solving hard problems.

### Areas of Expertise

- Solving hard problems
- Product-design strategy and de-risking
- Electro-Mechanical Engineering
- Product development and early-stage manufacturing
- First Principles Research
- Recruitment events, community-building and team-building
- Lab construction and optimization
- Business and sales strategy

### WORK HISTORY

#### July 2014-present      **Director, Isobar NowLab Americas**

Responsible for designing and building out NowLab research facilities in North and South America for Isobar (a 7,000 person digital agency). Lead the effort to build the NYC, Chicago, Boston, Porto Alegre and Detroit labs. Designed, engineered and managed the creation of portable battery pack systems, employee feedback IoT devices, photorealistic VR/AR apps (including the worlds first roomscale VR music experience, and photorealistic vacation simulator). Also acted as an innovation consultant for ~10 Fortune 500 companies on

behalf of Isobar. My de-risking efforts and technology demos have led to winning more than \$3M worth of business for Isobar. Managed several projects simultaneously with teams of 2 to 10 people per project.

**Jan 2011-June 2014**      **MIT SENSEable City Laboratory - Research Engineer**

Designed and built a 90 unit robotic heating system (Local Warming). Invented a unique computer vision + servo-controlled heating system as a superior alternative to conventional building heating. The system tracks the user and beams infrared heat directly as the user moves around the room. Using SolidWorks, designed four prototypes and managed a team of post-docs, graduate and undergraduate students to make the project a success. Fabricated mostly from sheet metal using a lasercutter, waterjet cutter, and TIG-welder.

**July 2006-2015**      **MistyWest Energy and Transport Ltd., Vancouver**

*Co-Founder*

- Built MistyWest from the ground up with zero investment capital
- Recruited top engineering, sales and project management talent
- Developed problem solving techniques and trained engineering staff
- Developed a sales process and trained sales staff
- Developed a marketing and community building strategy, and trained marketing staff
- Engineering R&D focused on portable power, mobility, robotics, IoT, medical devices, wearables, and VR hardware

Select clients and projects include:

**MetaMason - custom 3D Printed Masks (June 2012-Jan 2013)** Managed the creation of 3D printed medical masks for a startup company. SolidWorks + Rhino/grasshopper was used to create meshes based on 3D scans. These scans were then automatically translated into parametric 3D masks that were custom fit to the users face.

**Copenhagen Wheel - Superpedestrian (Jan 2011 - Sept 2012)** Managed a team of engineers to create the first successful, smart-phone controlled lightweight electric bicycle wheel. Assisted in the creation of the company and finding investors. Used Solidworks to design the packaging and internal mechanisms. Guided electrical engineers in the design of the control electronics and software. Worked with manufacturers in Singapore and Shenzhen.

**Rapid Electric Vehicles (Aug 2008 - Aug 2012):** Designed battery enclosures, air cooling systems, support brackets, motor/transmission assemblies, half-shafts, and motor mounts for a Ford Escape based EV drivetrain. As project manager, hired and lead a team of engineers and technicians to complete a prototype electric SUV. Oversaw the implementation of BOM, ECO, CAD and the creation of a supply chain. For the next prototype, recruited and hired top design talent and a engineering product manager. Transitioned to head of R&D and assisted with design of the next generation vehicle.

**Institute for Sustainable Futures (2010):** Worked with a team of engineers and PhDs to analyse technical barriers to EV adoption in Australia. Co-authored and delivered a barrier and policy solution recommendation report.

**Storefront.com Automated Vending Machines (Apr 2007–Dec 2008):** Designed and fabricated robotic components on contract. Used SolidWorks top-down design techniques to develop and integrate optical sensors, conveyor tracks, machined/moulded/stamped parts, servomotors, load-cells and mounting brackets.

**AFCC Automotive Components (Jan 2008–Dec 2008):** Used ProE and SolidWorks to design stamped metal plates for effective water management and freeze-start capability. Designed the die/punch sets necessary for stamping stainless steel less than 0.5mm thick. Built/stamped prototype parts and created DOE process for their evaluation. Carried out FMEAs and ex-situ experiments.

**Oct 2005 - Sept 2011                      Mondo Spider Electro-Mechanical Walking Machine**

Founded and managed the design and construction of the Mondo Spider ([www.mondospider.com](http://www.mondospider.com)). With top-down design techniques in Solid Works, designed the space frame and drive train system. MIG and a TIG welded the frame. Set up a workspace and managed a team of 10 technicians in the construction of mild steel tube leg components using Solid Works weldment templates. Managed the BOM and Gantt chart. Using a milling machine, a lathe and a TIG welder, fabricated the cranks for the leg linkages.

**May 2006 - Aug 2006                      Polyfuel Inc.**

*Unit Cell Engineer*

Designed and built a hydrogen reference electrode for use in a direct methanol fuel cell. Designed and built a wet/dry membrane cycling machine. The control system consisted of Omron Timers, solenoid valves, pressure regulators, heating pads, and proximity sensors.

**May 2004 – Jan 2006                      Ballard Power Systems**

*PEM Unit Cell Engineer*

Worked with the Unit Cell team to improve the performance of hydrogen fuel cells. Researched failure modes using standard FMEA techniques. Successfully solved ice blockage problems by inventing a unique plate design (*US20080113254*). Using ProE and AutoCAD, designed flow-field plates. Developed excel-based water management models. Tested fuel cell stacks from 150 watts to 5 kW.

**May 2004-Sept 2004                      Farad Electric Bicycle**

*Chief Engineer*

Designed and built an electric bicycle for a design course at UBC. Constructed a battery pack and integrated the motor controller and the hub motor into the frame. Top speed was 48 km/hr.

**May 2002-Jan 2003                      Motorola Labs**

*DMFC Fuel Cell Engineer*

Designed methanol compatible pumps and valves for micro fuel cell systems. Successfully developed a high flow rate, low cost, fully integrated, piezo-electric micro-pump. Measured polarization curves and monitored relatively steep degradation rates.

**Jan -May 2003                              Angstrom Power - Engineering Physics Project**

Developed a stochastic fuel cell failure model using Excel and Visual Basic programming. Used Monte-Carlo simulations to determine the behavior of an array of PEMFCs connected in series and parallel. Fault tolerance, MTBF, Lifetime and reliability were predicted for specific inputs from Angstrom Power.

**May –Sept 2001                            UBC DNA Sequencing Lab – Engineering Co-op**

Designed and developed a high throughput gel-electrophoresis sample-loader. Fabrication techniques used: Polyurethane molding, aluminum machining and silicone mold construction. Published: "Facilitated Loading of a Horizontal Gels Using a Capillary Gel Comb", *BIOTECHNIQUES*. 34:814-818 2003

**May 2000- Sept 2000                      Ballard Power Systems – Fuel Cell Systems Co-op**

Assisted in design and fabrication of prototype gas-to-gas humidifier for a portable PEMFC.

Tested multiple iterations of humidifier prototypes. Designed and modified testing equipment for leak testing. Helped setup a facility for the manufacturing of the humidifiers.

**Jan – May 2000                      Creo Products – Engineering Co-op**

Designed, and developed a silent contactless plate pick-up device. Awarded patent US6,601,888.

**June 1998- Aug 1999                      UBC Solar Car Project**

Co-designed and built the first UBC Solar Car. Built the wheel fairings using fiberglass and foam. Built aeroshell with vacuum bagging techniques. Performed several lay-ups w/ Kevlar and carbon fiber. Led a team of engineering students to race the car in Washington DC.

## **PRACTICAL SKILLS**

- *Soft skills:* conflict resolution, negotiation, community building, recruitment, lead generation, deal closing, finding win-win solutions, motivating team members, training, public speaking, fluent in French
- *Problem Solving:* rapidly gaining a fundamental (first principles) understanding of a problem and systematically developing a wide range of solutions and technology road maps to optimize solutions
- *CAD Software:* SolidWorks/Simulation +API, AutoCAD, Rhino, and ProE
- *Shop Tools:* shopBot, lasercutters, Omax waterjet, milling, lathe, MIG/TIG welding, plasma cutting, oxy-acetylene torch, Stamping, jigs, die-cutting, adhesives, two-part polymer casting, 3d printers
- *Composite:* Fiberglass Lay-up, Foams and Resins, Finishing
- *Lab:* Data-Acquisition, Oscilloscopes, LabView, Digital Multi-meters, Thermocouples, SEMs, Test stands, load banks, mass-flow controllers, and humidifiers
- *Electrical:* Sensors, servos, basic circuit design, wiring, debugging
- *Computer:* C++, Java, basics of Unity
- *Analysis Skills:* FMEA and DOE, trade-off studies, Excel-based Modeling

## **SELECTED PUBLICATIONS AND PATENTS**

US Pat. 6601888 - "Contactless Handling of Objects" – Christie, Delta, BC (CA), Creo Inc. Mar 19, 2001

US Pat. 9095766B1 – "Folding concealable skateboard" – L. Christie, Vancouver, BC, Canada, March 3, 2014

US Pat. 20080113254A1 – "Apparatus and method for managing fluids in a fuel cell stack" – L. Christie, Ballard Power Systems, Sept 7, 2006

US Pat. 10323035 - Passive Membrane Microvalves, Christie, Xie, Phoenix, AZ (US), Motorola, Dec 18, 2002

J. Thompson, T. Pugh, K. Guggenheimer, A. Safarpour, A. Christie, J. Pel, S. Chow, A. Marziali, "Facilitated Loading Of Horizontal Gels Using A Capillary Gel Comb", *BioTechniques*, 2003, 34:814-818 (PDF)

## **SELECTED SPEAKING ENGAGEMENTS**

“The Future of Data Driven Immersive Experiences” CES 2018  
“Harnessing the Power of the Immersive Experience” - WP Engine Summit 2017  
“The Learning Machines” – OMMA AI Forum 2017  
“Understanding Users” FutureWorks– NYC 2017  
“The Future of Immersive Tech” - AWE – SF 2017  
“Emerging Technology” Ethereal – NYC 2017  
“Future of Immersive Media” MediaPost IoT Forum NYC 2017  
“VR is eating AR” - AR in Action conference at MIT Media Lab 2017  
“What I Do” Adidas Creative Event 2016  
“Reality Virtually Hacking” at MIT Media Lab 2016  
“The Future of VR” - Creative Technology Week 2016  
“Exploring Future Reality” – NYC Media Lab 2015  
“Art Vs. Purpose” SXSW Interactive 2015 2015  
“Heating Buildings is Stupid” Solve-For-X Talk, TEDx, Boston, MA 2013  
“How Art can Improve Engineering” Retune, Berlin, 2012  
“Robots from Scratch” Artisan’s Asylum, Cambridge, 2012  
“Digital Fabrication” Harvard, Cambridge, 2012  
“Rethinking Progress with Energy and Art”, TEDx 2011  
“Crowdsourcing for large scale collaborative design” Remixology Panel, Fresh Media, Vancouver 2010.  
“Barriers to large scale design” Emily Carr University Foundation Talk, Vancouver 2010  
“Developments West of the Pacific” EV2010VE Conference, Vancouver 2010  
“Modular Drive Systems for EVs” EV2010VE Conference, Vancouver 2010

## **HOBBIES AND INTERESTS**

I love making sculptures, singing, DJing, playing squash, Nordic skiing, yoga, snowboarding and meditating.