



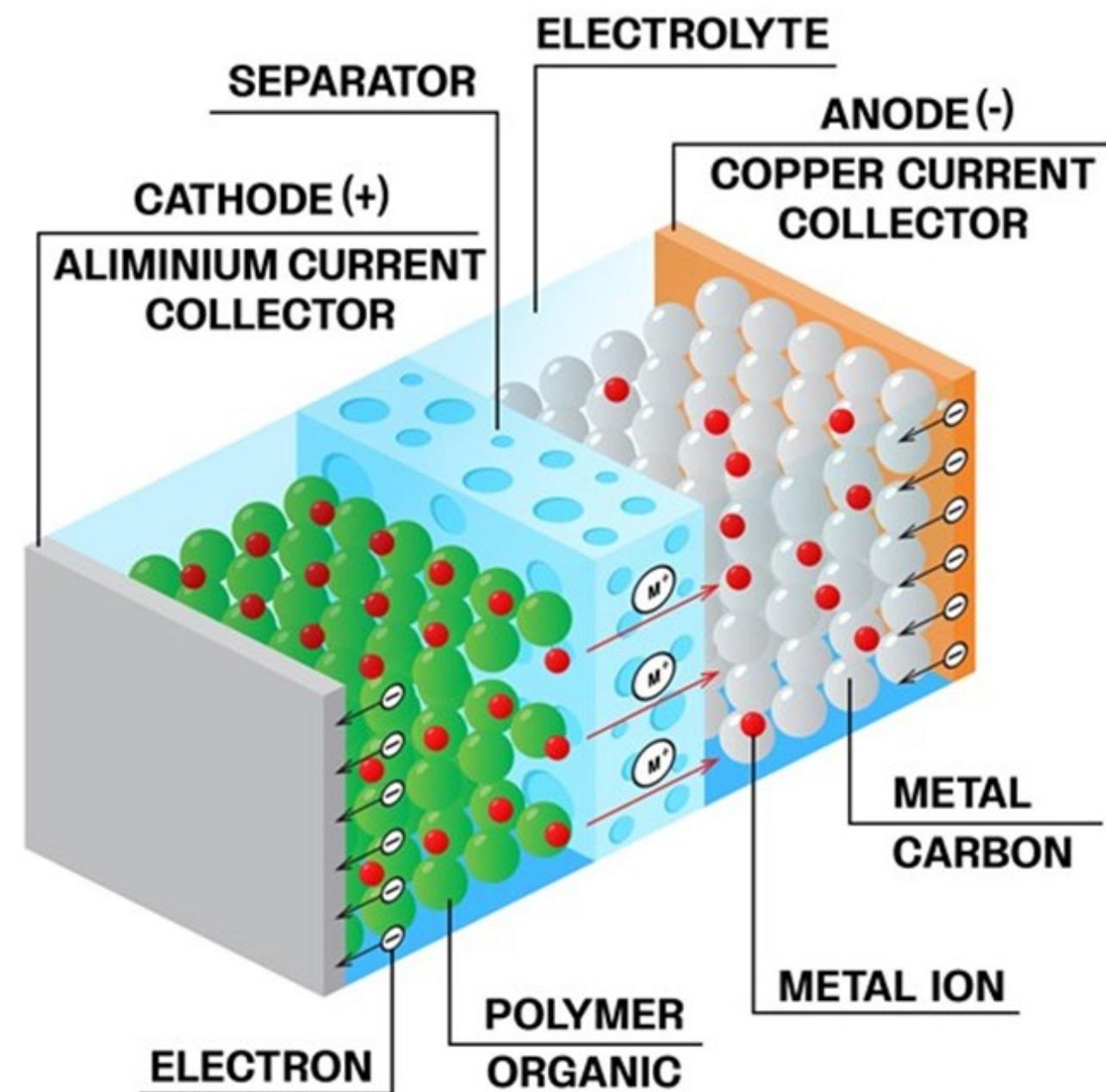
# Alionyx Energy Systems Inc.

## NAATBatt 2022

# This is Alionyx

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- Founded in 2017, Alionyx Energy Systems is a battery materials company that aims to reduce reliance on metal electrodes within the battery industry.
- Alionyx is utilizing our proprietary redox active polymers to deliver a high energy, long lasting, safe, and sustainable cathode.



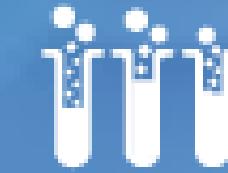


# This is Bettergy

An energy materials and nanotechnology company developing advanced battery and nanopore engineered membrane technologies



INNOVATE



INCUBATE



IMPACT

# The Company

Bettergy was formed to conceive, develop and commercialize innovative energy and environmental technologies.



## Intellectual Property

Six US patents issued, one US patent allowed, nine US patents pending



## Talented Team

15 employees and consultants, seven with PhDs. Expertise in electrochemistry, batteries, nanomaterials, polymers, and membrane fabrication



## SBIR Funding

Over \$18 million in SBIR and other grant funding received, including from DOE, ARPA-E, DOD, NASA, NIH, NSF and NYSERDA



A faint, light-gray circuit board pattern serves as the background for the logo, consisting of various interconnected lines and pads.

**LiNova**  
Energy Inc.

# Timeline

## Bettergy Technology Development

1994 ~1998 PhD Work | FOCUS: Lithium Metal Deposition with Solid Polymer Electrolyte

2010 SPONSOR: DOD | FOCUS: High capacity cathode for Li ion batteries

2011 SPONSOR: NASA | FOCUS: Li Metal Batteries

2012 SPONSOR: NSF | FOCUS: Ion Selective Membrane

2013 SPONSOR: ARPA-e RANGE | FOCUS: Solid State Battery for EVs

2014 SPONSOR: NASA | FOCUS: Li Metal Batteries with Membrane  
SPONSOR: DOD | FOCUS: Solid State High Power Battery

2015 SPONSOR: DOE | FOCUS: Li Metal Batteries

2016

2017

2018 SPONSOR: Private | FOCUS: High Temperature Rechargeable Lithium Batteries

2019 SPONSOR: DOE | FOCUS: Li ion selective membrane for extraction

2020

2021

2022

## Alionyx Technology Development

JULY: Alionyx Energy Systems Inc. founded | DEC: Series Seed Round Closed (\$2.6M)

MAR: Gen 1 Polymer was invented

FEB: Polymer manufacturing scale-up | JULY: Gen 2 Polymer Developed | AUG: Patent Filed

JAN: California Energy Commission Grant awarded

FEB: Gen 1 commercially manufactured cells built | NOV: Gen 2 Patent Filed

JAN: Gen 3 Polymer Developed | NOV: 3rd party testing completed 1000 cycles with Li

LiNova

# The LiNova Advantage



## MORE ENERGY

Projected 450 Wh/kg for significantly longer life/ range



## LOW COST

Using existing infrastructure / manufacturing techniques and an inexpensive, readily available polymer



## LIGHTER

Polymer Cathodes are significantly lighter than conventional cathodes



## FAST CHARGING

LiNova's proprietary chemistry will allow for faster charging than conventional Li-Ion batteries



## SAFE

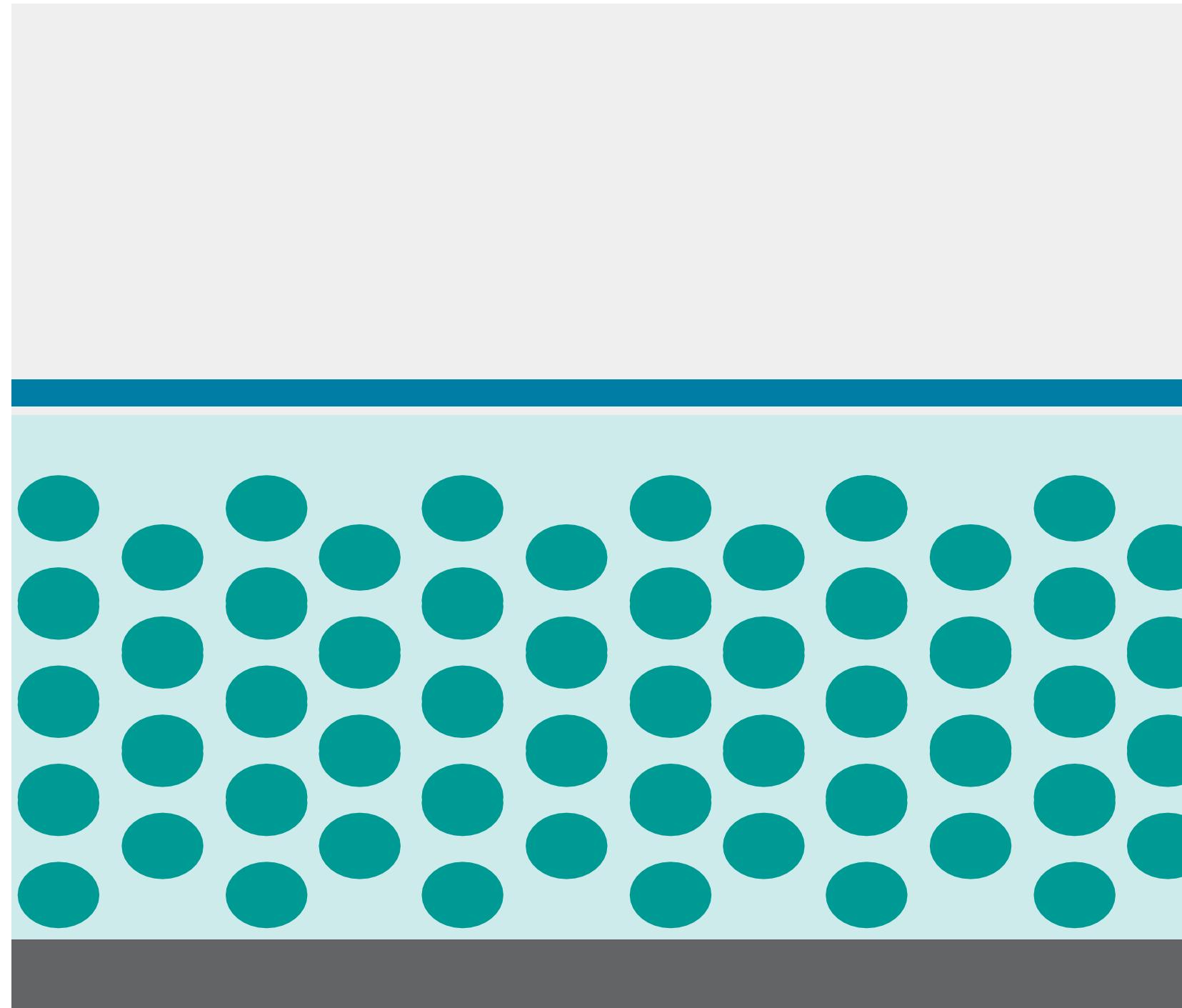
Proprietary electrolyte, dendrite blocking solid-state membrane and polymer cathode provide a significantly safer system with no thermal runaway



## SUSTAINABLE

Polymers are abundant, locally sourced and will replace reliance on nickel and cobalt

# LiNova LMB Technology



## 3D Lithium Anode:

- simple manufacturing process
- contains the volume change
- allows bottom up Li deposition

## Solid State Membrane:

- dendrite blocking

## Non-flammable Electrolyte:

- compact Li deposition
- high coulombic efficiency (>99.8%)

## High Capacity Polymer Cathode:

- lightweight, sustainable and low cost

# Patents and Other Intellectual Property

- **Li ion selective membrane:** US 9,997,801
- **Li separation membrane:** U.S. provisional patent No. 63/175,155
- **3D Lithium anode:** U.S. patent allowed (Appl. No. 16/802,061)
- **3D Lithium anode:** continuation U.S. Patent application in preparation
- **Dendrite suppression electrolyte:** U.S. provisional patent No. 63/280,187
- **Solid state membrane for dendrite suppression:** patent application in preparation
- **Nonflammable electrolyte:** patent application in preparation
- **Crosslinked Polymers And Related Compositions, Electrochemical Cells, Batteries, Methods And Systems:** Appl. No 16/593935
- **Redox Polymers Composition for nonaqueous rechargeable batteries:** patent application in preparation

# Our Team



## MIKE NAGUS, CEO

Mike is currently the CEO of Alionyx Energy System and has held upper level management positions for the past 14 years in various industries. The last 12 of which have been in the commercial battery manufacturing space as President and Founder of Tekcor Battery Solutions, President of Charger Industries and Vice President of Power Products at HPC (Parent company of Engineered Power and Charger Industries). Mike has a Bachelors of Science in Mechanical Engineering from the University of Saskatchewan.



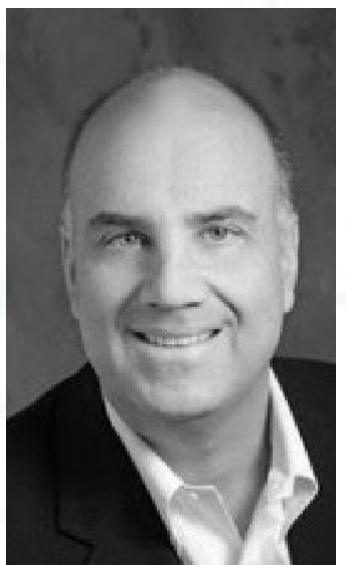
## ZEIAD MUNTASSER, COO

Zeiad is currently the president and chief engineer of Alionyx Energy Systems. He has over 18 years of technology and leadership experience. His expertise is in new product development, battery design and electrode coating and processing. Prior to AES, Zeiad was the director of product development with Engineered Power. He also worked at Enevate as a team leader, engineering materials in silicon systems. Zeiad also worked for Enersys, Powergenix and Reveo. Over the course of his career, Zeiad has managed over 30 million dollars of private and government projects. He has over 10 pending and granted patents and over 15 publications. Zeiad has an M.S. in corrosion from Dalhousie University and B.S. in mechanical engineering.



## LIN-FENG LI, CTO

Lin-Feng has two decades of energy technology and management experience. Experience includes scaling up a battery manufacturing facility from scratch and bringing the venture to full production, testing, marketing, sales and product distribution and, at Bettergy, spinning out a lithium battery and membrane technology that is now in full-scale prototyping. B.S. degrees in both Chemistry and Applied Physics from Tsinghua University and Ph.D. in Chemistry from Case Western Reserve University.



## GUY LONGOBARDO, VP OPS NY AND GENERAL COUNSEL

Guy has business and legal experience in a broad range of industries. Experience includes positions with HSBC Securities (Managing Director and Head of Corporate Finance) and ETS Payphones, Inc. (Chairman and CEO), serving as a public official and on corporate, community and non-profit organization boards. BA in Economics from Williams College and JD from Columbia University School of Law.



## BOB GALYEN DIRECTOR AND TECHNICAL ADVISOR

Bob is recognized as one of the top executives in the battery energy storage world and science/engineering-based communities. His positions as CTO of CATL (the world's largest battery manufacturer), Chairman of SAE International Battery Standards Steering Committee, SAE Fellow, Chairman Emeritus and CTO of NAATbatt International, provides him a unique leadership perspective in the global battery industry. His degrees in chemistry and biology, along with decades of engineering experience and executive roles, provides him a unique view in a leadership or consulting role in cross functional technology areas. He has patents, publications and participates on multiple BOD's and TAB's. The 44 years' international work experience has given him a visionary perspective on worldwide business, making him uniquely qualified as a global energy storage and scientific/engineering community thought leader.



# LiNova

Energy Inc.

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