

# Fostering Chemical Entrepreneurship



APRIL 23-24, 2019 | WILMINGTON, DE

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### TIPS FOR A SUCCESSFUL MEETING



Say **hello** to everyone. You might make someone's day.



**Introduce** yourself to people you don't know. They may be your next good friends.



Stop and **smile**. You will brighten the room considerably.



Be **understanding.** Everybody makes mistakes.



**Help** those with less experience. We were all novices at some point.



**Respect** others. We all have something valuable to contribute.

Value staff and volunteers. They are here for you.



Be **kind.** You will never like everybody, but you can be cordial to all.



**Enjoy** the meeting! You can have fun while sharing,learning and networking.

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### **Conference Chairs**

Charles Paul, VP, Technology, *Henkel Adhesive Technologies* Charles Roe, CTO, Co-Founder, *AlgiSys* Wayne Tamarelli, Owner and President, *AWT Private Investments* 

### **Organizing Committee**

Eric Breese, Evonik Venture Capital Mark DeGrandpre, Ben Franklin Technology Partners Jim Gunton, Tech Council Ventures Edward Greer, Dow Chemical William Provine, Delaware Innovation Space Nemoy Rau, US Biometrix Purnesh Seegopaul, Pangaea Ventures Anna Lee Tonkovich, Tonkomo LLC Bryan Tracy, White Dog Labs

### **Co-Organizers/Supporting Organizations:**











TECHNICAL PROGRAM

Tuesday, April 23	
7:00 AM - 8:30 AM	Badge Pick-up
8:30 AM - 8:45 AM	Welcoming Remarks
8:45 AM - 10:45 AM	Session 1: Role of Venturing in the Chemical Industry Session Chair: Chuck Paul, Henkel Adhesive Technologies
8:45 AM - 9:05 AM	Jacob Grose, BASF
9:05 AM - 9:25 AM	Eric Breese, Evonik
9:25 AM - 9:45 AM	Jay Amarasekera, Sabic
9:45 AM - 10:05 AM	Edward Greer, Dow
10:05 AM - 10:25 AM	Greg Fleming, Air Liquide
10:25 AM - 10:45 AM	Panel Discussion
10:45 AM - 11:05 AM	RAPID Manufacturing Institute Talk: William J. Grieco, CEO, RAPID
11:05 AM - 11:20 AM	Break
11:20 AM - 12:20 PM	<b>Startup Presentations Part I</b> Session Chair: Purnesh Seegopaul, Pangaea Ventures
7 min	MCET Technologies
7 min	Allied Microbiota
7 min	W7Energy
7 min	RiKarbon
7 min	Intrida
7 min	Thrupore Technologies
7 min	SAS Nanotechnologies
7 min	Nanotech Industrial Solutions
12:20 PM - 1:35 PM	Lunch & Startup Networking Break
1:35 PM - 3:05 PM	Keynote Session: Vanessa Chan, University of Pennsylvania
3:05 PM - 3:20 PM	Break
3:20 PM - 5:20 PM	Session 2: Incubation Space for Chemical Startups Session Chair: William Provine, Delaware Innovation Space
3:20 PM - 3:50 PM	William Provine, Delaware Innovation Space
3:50 PM - 4:20 PM	John Carlisle, Chain Reaction Innovations
4:20 PM - 4:50 PM	Christina Pellicane, Horn Entrepreneurship Center, University of Delaware
4:50 PM - 5:20 PM	Tony Stanco, NCET2



5:20 PM - 5:35 PM	Break
5:35 PM - 6:35 PM	NCET2 Startup Presentations Session Chair: Tony Stanco, NCET2
7 min	Cycladex
7 min	Lectrolyst
7 min	ReliOx Corporation
7 min	MesoMat
7 min	Aequor
7 min	Pilant Power Devices
7 min	TerraCOH
7 min	STF Technologies
6:35 PM - 8:00 PM	Dinner & Startup Networking Reception

Wednesday, April 24	4th
7:30 AM - 8:30 AM	Badge Pick-up
8:30 AM - 10:30 AM	Session 3: Chemical Startup Strategies Session Chair: Charles Roe, AlgiSys
8:30 AM - 9:00 AM	Xun Wang, Triton Algae Innovations, Ltd.
9:00 AM - 9:30 AM	Bryan Tracy, White Dog Labs
9:30 AM - 10:00 AM	David Sudolsky, Anellotech
10:00 AM - 10:30 AM	David Mackanic, Dorm Room Fund
10:30 AM - 10:45 AM	Break
10:45 AM - 11:45 AM	Startup Presentations Part III Session Chair: Wayne Tamarelli, AWT Private Investments
7 min	Precision Polyolefins
7 min	Carbon Upcycling Technologies
7 min	iMicrobes
7 min	Radical Plastics
7 min	EcoCatalytic
7 min	Tandem Repeat Technologies
7 min	Copprint
7 min	Compact Membrane Systems

TECHNICAL PROGRAM



11:45 AM - 1:15 PM	Lunch & Startup Networking Break
1:15 PM - 2:45 PM	Session 4: Lessons Learned and Structuring Deals for Success Session Chair: Henry Uyeme, Intrida
	Panel Discussion: Judy Giordan, ecosVC Laura Silva, University of Arizona Rajeev Prabhakar, A.T. Kearny, Inc. Andrew Cottone, Adesis Ray Miller, Verdecute Consulting Charles Andres, Wilson, Sonsini, Goodrich & Rosati
2:45 PM - 3:45 PM	Session 5: Outcomes and Exits Session Chair: Nemoy Rau, US Biometrix
	<b>Panel Discussion:</b> Marc Privitera, PreProcess, Inc. Purnesh Seegopaul, Pangaea Ventures Neil Cameron, Emerald Ventures Steve Dubin, SDA Ventures
3:45 PM - 4:00 PM	Break
4:00 PM - 5:05 PM	Session 6: Strategic vs. Financial Investing Session Chair: Neil Cameron, Emerald Ventures
4:00 PM - 4:07 PM	Charles Paul, Henkel Adhesive Technologies
4:07 PM - 4:14 PM	Michael Krel, Sofinnova
4:14 PM - 4:21 PM	Frank Klemens, DuPont Ventures
4:21 PM - 4:28 PM	Wayne Tamarelli, AWT Private Investments
4:28 PM - 4:35 PM	Laurence Hayward, Independence Equity Venture Fund
4:35 PM - 5:05 PM	Panel Discussion
5:05 PM - 5:15 PM	Closing Remarks

# We are excited to have the following startups with us at **#CVC2019**

- Aequor, Inc.
- Allied Microbiota, LLC
- Carbon Upcycling Technologies
- Compact Membrane Systems
- Copprint
- Cycladex, Inc.
- EcoCatalytic, Inc.
- iMicrobes
- Intrida
- Lectrolyst, LLC
- MCET Technologies, LLC
- MesoMat

- Nanotech Industrial Solutions, Inc.
- Pilant Power Devices
- Precision Polyolefins, LLC
- Radical Plastics, Inc.
- ReliOx Corporation
- RiKarbon, Inc.
- SAS Nanotechnologies
- STF Technologies, LLC
- Tandem Repeat Technologies, LLC
- TerraCOH, Inc.
- Thrupore Technologies, Inc.
- W7Energy, LLC

# COLLABORATION

Henkel's Adhesives Technologies touches virtually every industry and country. Our investment platform, **Henkel Ventures**, facilitates collaboration with start-ups in a variety of fields. Our global reach provides unparalleled market access and a range of complementary technologies to any new venture.



henkel-ventures.com

Henkel Ventures

(Henkel)

# **AEQUOR, INC.**

#### PRESENTER BIO:

Marilyn Bruno Ph,D., J.D. is CEO of Acquor, with >20 years' experience in C-level positions in international finance, trade and law. She launched several ventures in the '80s, was featured in *Business Week* and named Woman Entrepreneur of the Year prior to serving 16 years as a diplomat in in the U.S. Foreign Service, responsible for the Economic Affairs portfolio (biosafety, biodefense, pandemic threats, etc.).

#### PRODUCTS / SERVICES:

--Green chemicals: Founder and CSO Cynthia Burzell, Ph.D. - Marine and Medical Microbiology – discovered a new genus and several new species of microbes in the marine microbiome that produce novel small molecules.

>30 novel structural analogs, of which 5 are new drug candidates.

>40 similar analogs, of which 25 are EPA TSCA-approved and available in commercial quantities for use as dispersants, surfactants, cleaning agents and fresheners.

--<u>Green products</u>: Water treatments for closed loop systems, including the NASA water recycling/reuse system used on board the ISS, water treatments in algae and yeast biomass production for biofuel and by-products. In prototype: agro-industrial and consumer surface and laundry cleaners; personal hygiene products, etc.

#### --Consulting Services:

--Lab testing: Microbial and Biofilm testing

--Site assessments: measures to "go green," save water, energy, reduce GHG emissions

#### TARGET MARKETS:

--\$50B EPA/TSCA-regulated markets: dispersants, surfactants, cleaning agents, fresheners and products containing them.

--\$200B EPA/FIFRA-regulated markets: antibiofilm, antifouling, antibacterial, antifungal agents and products containing them.

--\$350K FDA-regulated markets: new drug candidates for therapeutics, device coatings

#### **TECHNOLOGY / DIFFERENTIATION:**

--Remove biofilm in minutes. Prevent biofilm formation for hours/days

- --Kill antimicrobial-resistant pathogens (the Superbugs)
- --Potentiate existing antimicrobials to kill pathogens at very low concentrations

#### PATENTS:

1 Granted: Novel marine microbes and natural chemicals: Methods of Use

2 Pending: >30 Novel structural analogs: Composition of Matter and Methods of Use >40 Existing structural analogs: Methods of Use

3 Provisionals: end-use product formulations for cleaning products, potentiators, etc.

#### COMPETITION:

Toxic biocides – harmful to the environment and health (e.g. MIT, BIT, Triclosan) Natural antimicrobials – ineffective to remove biofilm (e.g. silver, plant extracts) Heat, UV, sonication – effective to remove biofilm, but not always practical

#### CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:

- Asking \$10M in tranches over 2 years to develop:
- Milestone 1 \$3.5 M Novel natural chemicals
- Milestone 2 \$5.0 M IP; Regulatory
- Milestone 3 \$0.4 M Lab operations
- Milestone 5 \$1.2 M Business Development; corporate legal

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:

Year 1-5 Proforma financials project breakeven in Year 2 and ROI x15 in Year 5 Revenue streams: B2B sales - chemicals, products, consulting services Aequor is a Woman Owned Small Business, eligible for Government set-asides



#### VALIDATION TESTING







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Contact Marilyn Bruno, Ph.D., J.D. CEO mbruno@aequorinc.com 202-210-5920

ASKING \$10M Target Market Years 1-5: \$50B

> TEAM 2 FT; 12 contractors

Total Amount Invested to Date: \$1.2M

# Allied Microbiota, LLC

#### **PRESENTER BIO:**

Frana James is the co-founder and CEO of Allied Microbiota (AMB). She has a passion and area of expertise in identifying pressing health and environmental concerns, and applying her engineering and business expertise to develop rapid and effective solutions. Prior to this, in India, she recognized a need for improved health care access particularly in the poorer communities and co-founded Behealthe to address this need.

**PRODUCTS / SERVICES:** Allied Microbiota (AMB) sells biologically based products to clean-up organic contaminants in soils and sediments. AMB's initial offering, PacBac can quickly degrade a wide range of long-lived and problematic organic pollutants. such as Total Petroleum Hydrocarbons (TPH), Poly-Chlorinated Biphenyls (PCBs), dioxins and furans, other chlorinated compounds such as chloro-benzene, and benzene, toluene, ethylbenzene and xylene (BTEX). AMB also has demonstrated preliminary success against emerging contaminants such as 1,4-dioxane and per- and poly-fluorinated alkyl substances (PFAS).

**TARGET MARKETS:** Globally, the bio-remediation market is estimated to grow to 66 billion dollars by 2015. In the US, 100 million tons of contaminated soils are excavated each year with a total treatment cost of over eight billion dollars. In the northeast regions that AMB is focusing on, approximately 12 million tons of soils are excavated and treatment cost exceed one billion dollars. AMB's partner, Clean Earth, handles over 3 million tons of excavated soils in the northeast each year. The remediation of residual contaminants will continue to expand as new technologies like AMB's make their clean up more cost effective. Contaminants related to the energy industry such as petroleum products will continue to dominate the type of excavated soils that need remediation.

**COMPETITION/TECHNOLOGY DIFFERENTIATION:** AMB offer cost savings of up to 80% compared to existing remediation technologies like expensive incineration and moving to classified landfills. Current remediation projects employing biotechnologies are measured in months to years and usually struggle with higher molecular weight aromatic hydrocarbons such as those associated with Manufactured Gas Plants (MGPs) or halogenated compounds such as PCBs. AMB's field trials have demonstrated a practical degradation rate of toxic PAHs of over 20% per day. This dramatically accelerates the treatment times and can provide a much faster turnaround time. Thus, Pac Bac offers the broad applicability of energy intensive, non-biological approaches, while providing more rapid destruction rates than other biological processes currently offered.

**PATENTS:** Filed provisional and in the process of filing a full patent application

**CAPITAL REQUIRED:USE OF FUNDS THIS ROUND:** \$750k for scaled up testing and establishing medium scale manufacturing facility

### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:

\$000	<u>2019</u>	<u>2020</u>	<u>2021</u>	2022	2023	<u>2024</u>
Revenue Centralized Treatment	60	700	1,500	4,000	7,200	12,000
Revenue Onsite Treatment	-	-	200	4,000	9,600	24,000
COGs	60	545	1100	2,691	4,713	7,817
Operating Cost	300	350	450	1000	1500	2000
Capex	105	105	350	400	2,000	1,000



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#### Contact

Frana James Co-founder & CEO frana.james@alliedmicrobiota.com 917 680 5436

Addressable Market Size: \$8B

Number of employees:

**Total Amount Invested to Date: \$600k** 

# Carbon Upcycling Technologies

#### **PRESENTER BIO:**

Apoorv Sinha founded Carbon Upcycling Technologies (CUT) in 2014 and has served as CEO since the commencement of the ERA (Emissions Reduction Alberta) Grand Challenge. He holds a BSc. in Chemical Engineering from the Georgia Institute of Technology (2010) and manages technical progress, business development, engagements with academic/industrial partners, scale-up, and commercialization of the firm's technology. Apoorv is a member of the Energy Futures Lab, a cohort of Albertans serving as a think-tank for policy trajectories to plot Alberta's transition to a low-carbon, sustainable energy future. Apoorv is also a Canadian Clean 50 Emerging Leader (2016) and most recently joined the Your Energy Future Cohort (2017), held by the Public Policy Forum. Apoorv was included in Alberta Oil's "35 Under 35 list" in July 2016, and had the opportunity to showcase CUT's work at TEDx Calgary 2017.

#### **PRODUCTS / SERVICES:**

CUT is an Alberta corporation with headquarters and operating facilities in Calgary. CUT was founded with the goal of making CO2 green: both environmentally and financially sustainable, where CO2 is not a liability but a fully utilized asset. CUT envisions a future where materials derived from CO2 can be used to enhance every facet of society: from buildings to adhesives, to even our medicine.

#### **TARGET MARKETS:**

CUT's nanoparticles have applications in various industries, particularly in concrete, construction, and plastics. Target markets include:

- additives for concrete mixes, asphalt mixes, adhesives;
- polymer reinforcement additives for polyethylene, polypropylene, polyurethane, epoxies, rubbers & nylons;
- solid lubricants or air filtration media;
- additives for lithium-battery systems; membranes for water filtration membranes.

#### **TECHNOLOGY / DIFFERENTIATION:**

CUT has devised a process to produce advanced solid material additives from CO2 emissions and cheap solid feedstock. Through a proprietary, patented technology, CUT can chemically adsorb CO2 emissions into exfoliated solid feedstock to create a portfolio of fine nanoparticles, such as graphitic nanoplatelets (GNPs), graphene oxide (GO), graphene quantum dots (GQDs), and enhanced fly ash (EFA). CUT's solution is unique in its broad portfolio of products with identified and validated technical use in a range of different areas ranging from high-volume, commoditized industries such as plastics and concrete, to advanced sectors such as photovoltaics, energy storage, and pharmaceuticals.

#### **PATENTS:**

CUT has an EU patent (P6068350EP) and a PCT patent pending (PCT/IB2018/055156) to protect proprietary information.

#### **COMPETITION:**

CUT has competition in carbon utilization and competition in applicable markets for our technology. In each market application, the product provides a disruptive alternative to current solutions incumbent in the marketplace, replacing CO2-intensive products with CO2-negative products that are cost-competitive and of equal or superior performance.

#### CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:

CUT is seeking strategic partners that can join as active investors and accelerate the sales of products.

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:

CUT is projecting \$1M in corrosion coating sales revenue over the next 2 years. CUT has a licensing model for enhanced fly ash and is currently identifying partnership companies to advance the plastics application.



Suite 1950, 639 - 5th Ave. SW, Calgary, AB T3P 0M9 1 (403) 234-7473 carbonupcycling.com a.sinha@cutco2.com

> Contact Apoorv Sinha CEO/Founder a.sinha@cutco2.com

1 (403) 234-7473

#### Addressable Market Size

Nucleators: \$5.1 Billion by 2020, at a CAGR of 21-23% from 2015 to 2020 Anti-corrosion coatings: USD 31.73 Billion by 2022, at a CAGR of 5.0% from 2017 to 2022 Fly ash: USD 4.5 Billion by 2023, at a CAGR of 6.0% from 2018 to 2023

> Number of employees 5 Full-Time Employees

Total Amount Invested to Date USD 4.7 million

### Need Help with Technology Commercialization & Business Start-Up?

### The Delaware Small Business Development Center:

- Delivers **FREE** expert guidance to move your innovation along the pathway to commercialization
- Helps innovators access the \$2.5BN Federal SBIR Grant Program (America's Largest Seed Fund)
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- Connects businesses to capital, mentors, and more

### SBDC IMPACT

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# Compact Membrane Systems

#### **PRESENTER BIO:**

Hannah Murnen is the Chief Technology Officer at Compact Membrane Systems. She has a background in chemical engineering with a PhD from University of California Berkeley and a Bachelors in Engineering from Dartmouth College. Prior to her work at CMS, Hannah worked at McKinsey and Company as an Engagement Manager. She worked with highly technical clients across materials, chemicals, and other industrials in the areas of strategy development and operations

# **PRODUCTS / SERVICES:** Fluoropolymer membranes for difficult industrial separations including olefin/paraffin separation, solvent dehydration, degassing of liquids

Compact Membrane Systems

### TARGET MARKETS:

Petrochemical and oil and gas Chemical manufacturing Industrial separations

#### **TECHNOLOGY / DIFFERENTIATION:**

Optiperm<sup>TM</sup> is designed to separate light olefins and paraffins (e.g., ethylene from ethane or propylene from propane). Currently these materials are separated through distillation which is both capital and energy-intensive. The Optiperm<sup>TM</sup> membranes enable the separation of olefins and paraffins through a low-capital, modular solution. Due to their unique fluoropolymer design, Optiperm<sup>TM</sup> membranes are stable in olefin/paraffin streams as demonstrated through over 800 days of testing in a mixed gas stream as well as over 50 days in the field at the Delaware City Refining Company. They provide the ability to recovery stranded olefins from purge streams and other bottlenecks within a petrochemical or refining plant. The resulting economics from an installation of Optiperm<sup>TM</sup> membranes are inherently positive with IRRs above 100% and payback times under a year

#### **PATENTS:**

#### A selection:

US20150025293A1, Membrane separation of olefin and paraffin mixtures US9168490, Combination membrane system for producing nitrogen enriched air US9079138 Organic fluid permeation through fluoropolymer membranes US8506815 Removal of water from fluids US8293112 Removal of water and methanol from fluids Several others in process

#### **COMPETITION:**

There is no commercial membrane solution for olefin paraffin separations so the competition is from incumbuent technologies such as distillation or other membranes currently in development

#### CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:

Contact Hannah Murnen (<u>hmurnen@compactmembrane.com</u>) or Erica Nemser (<u>enemser@compactmembrane.com</u>) to discuss further

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:

Contact Hannah Murnen (<u>hmurnen@compactmembrane.com</u>) or Erica Nemser (<u>enemser@compactmembrane.com</u>) to discuss further 335 Water Street, Newport, DE 19804 302-999-7996 www.compactmembrane.com

Contact Hannah Murnen CTO hmurnen@compactmembrane.com 312-498-4522

Addressable Market Size >\$4Bn

Number of employees 24

**Total Amount Invested to Date** 

# Copprint

#### **PRESENTER BIO:**

Dr. Ofer Shochet is an entrepreneur and a technology visionary, specializing in driving bleeding edge technologies into profitable real solutions. Ofer is the founder of Copprint and serves as a Board member at Velo 3D Inc (Premier metal 3D printing developer).

Previous positions: (2009-2014) EVP Products, Stratasys (NASDAQ:SSYS), a world leader in 3D printing.; (2008-2011) Founder - Navajo Systems (acquired by salesforce.com) a pioneer in SaaS security.; (2002-2008) – SVP Verint (NASDAQ:VRNT) - focusing on technologies development in the area of speech, text and video analytics.

Ofer holds a PhD and MSc (Magna cum Laude) in Physics from Tel Aviv University and has been awarded with the Presidential Israel Security award.

#### **PRODUCTS / SERVICES:**

Conductive Copper inks are finally available. Just print and sinter for a few seconds to achieve up to 40% bulk conductivity. The new inks allow low-temperature sintering under air and do not require any special equipment such as photonic or laser sintering. Made out of Copper nanoparticles - it is much cheaper than silver inks, environmentally friendly and compatible with standard printing equipment. Our inks have been tested by top customers and achieve extremely high conductivity and excellent durability. First inks developed are for screen printing.

#### TARGET MARKETS:

# Our conductive Copper ink is a basic building block for all printed electronics. Our initial focus is:

- RFID antenna printing – we enable printing antennas on paper which are cheaper than etched antennas and more sustainable. A Reel-2-Reel printer has already been built by our strategic partner Muhlbauer, the world leader in RFID equipment. With 500M antennas/year capacity per printer consuming 12 Ton ink/year, we are ready to serve the multi-billion unit RFID market.

- HJT Photovoltaic metallization – achieving similar efficiencies of top silver inks with 3-5 x lower cost.

- PET & PI printing of one- and two-sided circuits.

#### **TECHNOLOGY / DIFFERENTIATION:**

- Patented chemical sintering agent enabling low temperature rapid sintering and avoiding copper oxidation during sintering.

- Trade secrets for dramatically cheaper than state of the art nano-Cu production. After many years and attempts to develop Copper inks by many industry players with no success, Copprint has a robust, simple and highly conductive solution.

- Copprint already achieved 2500x production scaleup, reducing all technical risks

- Typical achieved conductivity sheet resistance = 2-4 m $\Omega/\Box/mil$ 

#### PATENTS:

"FORMULATIONS AND PROCESSES FOR PRODUCING HIGHLY CONDUCTIVE COPPER PATTERNS" - Israeli patent #247113 granted 2018 ; PCT patent #IL20 17/050860 registered in 8/2017.

#### **COMPETITION:**

- Silver ink printing
- Etching of one sided/two sided PCBs and antennas
- Copper oxide inks leveraging photonic or laser sintering

#### CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:

- \$6-10M – to build a production facility and operation infrastructure and to extend product portfolio

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:

- Currently \$120k/month burn rate. Aiming for few \$M revenue in 12 months: Breakeyen in 24 months: \$xxM profitability in 36 months



19 Hartom st. Jerusalem, ISRAEL www.copprint.com

> Contact Ofer Shochet CEO & Founder ofer@copprint.com +972-54-7313777

Addressable Market Size \$5B

Number of employees 11

Total Amount Invested to Date €3M – Henkel & HP

# Cycladex Inc

**PRESENTER BIO: Roger Pettman, PhD DSc.** Post Doc at Stanford, 10y with Shell before moving to the US. Co-founder of ChiRex, licensed Chemistry technology from Harvard, MIT and Stanford. Nasdaq IPO before acquisition by Rhodia. Founder of Revolymer, raised \$75m before IPO on AIM on the London Market. Co-Founder of Cycladex with Sir Fraser Stoddart, Nobel Laureate.

#### **PRODUCTS / SERVICES:**

Developed a new, environmentally friendly cost effective process for extracting and isolating gold and silver with a focus on markets where the existing process of sodium cyanide either does not work or is banned for environmental reasons. The technology has been scaled at pilot plant and plans are in place for the first semi-commercial plant. The focus is on materials either high in iron and/or sulfur. The other key aspect is the ability to crystalize gold using an inexpensive cyclodextrin Which allows purification from any other metal such as copper.

#### TARGET MARKETS:

Waste derived from sulfuric acid production called pyrite cinders or slag. The process has been shown to work in high yield (905+) in the presence of 50% iron and sulfur (5%) plans are to scale-up with a large multi-national. The waste has \$1b of gold and is already milled and requires no further treatment. The Company is also setting up a plant for small miners in Arizona to process ores as they cannot permit cyanide. The Company has 2 other mines with existing equipment where cyanide yields are no longer economic.

#### **TECHNOLOGY / DIFFERENTIATION:**

A system has been developed which is based on a halide but the key is that any waste or halide which is generated as a potential waste is recycled with an oxidant to give effectively zero halide waste. The economics have been demonstrated to be cheaper compared to alternative technologies such as sodium cyanide.

#### PATENTS:

The Company has two patents, one licensed from Northwestern University which Has been granted in key markets and a second covering the extraction.

#### **COMPETITION:**

For the high sulfide ores, Dundee Technologies and Enviroleach claim to have technology. Traditional cyanide Is not considered a competitor in the markets targeted.

#### CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:

Seeking \$2m. Use of proceeds for scale-up, patents, business development and Marketing.

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:

SBIR Phase I, IB and II have provided funds together with management. The revenue projections:

- 2020 \$2.5m
- 2021 \$6m
- 2022 \$11m with \$5m royalty.
- 2023 \$20m with \$10m in royalty.



Cycladex Inc 1319 N New York Avenue Winter Park FL 32789 1 617 331 1130 www.cycladex.com

Roger Pettman Chairman and CEO <u>roger.pettman@cycladex.com</u> 617 331 1130

Addressable Market Size \$3b+

Number of employees 5

Total Amount Invested to Date \$1.4m

# EcoCatalytic Inc.

**PRESENTER BIO:** Dr. John A. Sofranko pioneered the field of the Oxidative Coupling of Methane (OCM) in the early 1980s as researcher at ARCO. He had executive management positions at ARCO Chemical and Lyondell Chemical Companies in strategic planning, mergers & acquisitions, commodity chemicals business management, and as chief technical officer. He was executive director at AIChE for 8 years and is also an AIChE Fellow. He has authored, or co-authored, over 60 US patents and numerous publications in the field of catalysis.

#### **PRODUCTS / SERVICES:**

EcoCatalytic develops sustainable technologies for hydrocarbon up-grading, to license.

#### **TARGET MARKETS:**

-Commodity olefin markets -Remote gas production for gas-to-liquid (GTL) conversion, such as Bakken shale gas

#### **TECHNOLOGY / DIFFERENTIATION:**

- -Direct, oxidative, conversion of hydrocarbons to olefins
- -Lower capital and operating costs
- -Significantly higher energy efficiencies thereby reducing carbon dioxide and NOx process emissions
- -For large scale ethylene production, the ability to build a world scale 1.5 MM tpy plant with one reactor, rather than multiple steam cracking furnaces
- -For small scale remote GTL, the ability to make a single, fungible fuel product for use at the production site
- -Fewer processing steps and no need for energy-intensive air separation plants

#### PATENTS:

US2017/0247803 A1; US 10,138,182 B2; WO 2016/209811 A1; WO 2018/005456 A1; WO 2018/075713 A1; WO 2018/208907 A1

#### **COMPETITION:**

-For commodity ethylene production, the main competition is existing steam cracking technology.

-For remote GTL, the main commercial competition is new pipeline projects. -Developing GTL competitors include technologies from Siluria and Velocys.

#### CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:

\$5 MM in B round for an innovative small scale OCM chemical looping reactor demonstration that targets the shale gas GTL market.

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:







561 Virginia Rd, Suite 302 Concord, MA 01742 978-610-6932 www.ecocatalytic.com

Contact: John A. Sofranko CEO jasofranko@ecocatalytic.com 978-610-6932

#### Addressable Market Size: \$1.4 Billion

Number of employees: 6

**Total Amount Invested to Date: \$8 MM** 

## Technology Development Commitments 2013-2021

	\$MM
Government (all projects)	8.02
Non-government	4.31
Total	12.33

# iMicrobes

iMicrobes is engineering new biocatalysts for upgrading methane and biogas.

#### PRESENTER BIO:

Derek Greenfield is the CEO of iMicrobes, a synthetic biology startup developing new processes to upgrade methane into commodity and specialty chemicals using engineered microorganisms. Derek has a Ph.D. in Biophysics from UC Berkeley and an A.B. in Chemistry and Physics from Harvard. Derek has ten granted or pending patents covering enzyme pathway construction, microbial gene discovery, and commercial strain scale-up. Prior to iMicrobes, Derek was a team leader at LS9 where he helped develop a commercial strain and process for the production of fatty alcohols in partnership with Procter & Gamble.

#### COMPANY OVERVIEW:

iMicrobes designs and builds new microbes with an appetite for low-cost gases. Feedstocks such as methane and ethane can accelerate biomanufacturing by lowering costs, unlocking large markets, and reducing carbon emissions. iMicrobes has moved enzymes out of methanotrophs and into established commercial microorganisms that already produce biobased products. Our mission is to work with partners to expand the palate of feedstocks available for chemicals, materials, fuels, and agriculture.

#### TARGET MARKETS:

Target chemicals include commodity and specialty chemicals such as alcohols, plastic monomers, amino acids, organic acids, and fatty acids. Specific targets include acrylic acid and acrylates, methanol, and C12/C14 fatty acids.

#### BUSINESS MODEL:

The company will jointly develop a fermentation process with a partner, which will be spun off into a joint venture. Each joint venture will focus on a specific market area. Licenses are also available.

#### PATENTS:

iMicrobes has filed four patent application families covering broad use of its enzymes and strains for production of many chemicals from methane and ethane. The company has an exclusive license to three patents filed by the University of Delaware, including one issued patent.

#### COMPETITION:

Other biotechnology processes for upgrading methane into chemicals are being developed by Calysta and Intrexon. Our process is differentiated by using standard industrial organisms already used at scale. Our competitive advantage is that we can modify existing organisms currently used for commercial production to consume hydrocarbons instead or in addition to carbohydrates.

#### INVESTMENT:

iMicrobes is backed by Silicon Valley investors including Y Combinator, SV Tech, CRCM Ventures, CLI Ventures, MicroVentures, Point Reyes Management eFund, and Three Bridges Ventures. Additional angel investors include Adam Draper and Jeff Huber (former CEO of Grail and head of GoogleX Life Sciences).

#### R&D GRANTS:

The company has received 8 grants from the following agencies: ERA of Alberta, ARPA-E, EPA, USDA, NSF, and Dept. of Energy. These grants have funded core technology development.



#### Industrial Microbes, Inc.

1250 45th Street Suite 330 Emeryville, CA 94608 (650) 731-5499 www.imicrobes.com info@imicrobes.com

Derek Greenfield, PhD CEO & Co-founder derek@imicrobes.com

Employees: 9

Total Funding: \$4.4M

# Intrida

#### **PRESENTER BIO:**

Henry is the Founder and CEO of **Intrida**, a Cambridge - UK based tech startup working on the research and the development of innovative 'intelligent data integration' solutions for a variety of industries like chemicals, oil/gas, process etc.

"Intrida is our avenue to sculpting out solution sets which employ the u se of modern and available technologies well as simple methodologies which attempts to allow for efficient validation and management of technical data within our target industries. Our mantra remains 'Keep things very simple!' ".

Currently at a seed fund raising stage and after a successful prototype development, Intrida has now started work on their flagship product beta development.

Henry holds a B.Sc in Mechanical Engineering (Major in Aeronautics) from the Budapest University of Technology and Economics, Hungary and an M.Sc in Mechanical Engineering (Major in Computational Modeling) from Aston University Birmingham, UK.

#### **PRODUCTS / SERVICES:**

The development of a powerful on-demand engineering data check system which verifies, visualises, compares, validates, tracks consistency & compliance progress, manages and reports on multi format engineering and design data, ergonomically & elegantly.

The research for optimized and intuitive methods for engineering data management activities. (Data visualization, verification and validation).

#### **TARGET MARKETS:**

- Oil & Gas
- Chemical & Petrochemical
- Other Plants (Pharmaceutical, Nuclear)
- Marine (ship building and outfitting)
- Building & Infrastructure

#### **TECHNOLOGY / DIFFERENTIATION:**

- Multi format engineering data types within a single platform
- Modern architecture with review dashboard
- Ergonomic, highly intuitive and elegant user interface
- On premise deployment
- Cloud and in app deployment
- Cross platforms
- Deployment for mobile devices
- Data Visualisation, verification and validation
- Data management
- Data consistency and compliance tracking/reporting
- Cost effective data quality management

#### **PATENTS:** None applied for

#### **COMPETITION:**

AVEVA Schematic 3D Integrator Intergraph Smart data Validator

#### CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:

#### Capital Required: \$700,000

Use of Funds: Software developers fees, Software Development Kits, Technology licenses, Beta marketing and PR, Product packaging, legal and accounts, US incorporation.



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Total Amount Invested to Date \$50,000

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:



# Lectrolyst LLC

#### **PRESENTER BIO:**

Greg Hutchings is the President and Co-founder of Lectrolyst, leading commercialization activities and development of electrocatalytic systems. He received his Ph.D. in Chemical Engineering from the University of Delaware, where he developed electrocatalysts and energy conversion solutions, followed by postdoctoral work at Yale University. Greg is supported by the Blue Hen Proof of Concept program through Horn Entrepreneurship at the University of Delaware, where he holds an appointment as a Postdoctoral Innovation Fellow enabling him to focus on building Lectrolyst full-time.

#### **PRODUCTS / SERVICES:**

Lectrolyst is building an innovative device for generating high-value multi-carbon chemical products from carbon monoxide, water, and cheap electricity. The company is an early-stage startup from the University of Delaware pushing this lab-validated invention towards commercial adoption. Chemical production from oil and natural gas emits waste carbon dioxide, leading most major producers to establish clear and aggressive future carbon capture, utilization, and storage (CCUS) goals. However, most complete CCUS solutions will be unprofitable in the short-term, and some, such as transforming carbon dioxide to carbon monoxide, require follow-on technologies to realize their full potential. Lectrolyst's technology links into the current chemical production chain for profitability in the short term, and just as easily links into CCUS solutions to be compatible with long-term, massive-scale shifts towards making chemical products from renewable and clean sources. There is also often a large mismatch between centralized production scales and end user needs, adding significant transportation costs – Lectrolyst's core technology is scalable to meet customer needs at any production level.

#### TARGET MARKETS:

Lectrolyst is targeting current chemical production companies seeking to balance short-term profitability with a long-term shift to CCUS and alternative feedstocks. These companies can also use the devices to build scaled, distributed plants which directly match the scale of their own downstream customers, minimizing chemical transportation costs. The global market for the chemical products generated by the device exceeds \$300 billion per year, with an addressable market of \$1.8 billion representing yearly investment in new reactors used to produce these chemicals.

#### **TECHNOLOGY / DIFFERENTIATION:**

Lectrolyst's device is enabled by a novel electrochemical reactor design developed at the University of Delaware, which allows practical, high-rate conversion of carbon monoxide to multi-carbon chemical products in a way that excludes lower-value single-carbon chemical products. This innovation opens a new pathway to generate chemicals normally made from oil and natural gas, allowing new production from renewable and eco-friendly feedstocks.

#### PATENTS:

The core technology is fully protected through a patent filed by the University of Delaware, which will be licensed for exclusive use by Lectrolyst.

#### **COMPETITION:**

The closest competing technology is direct conversion of carbon dioxide into chemicals, which tends to be more effective for single-carbon products (including carbon dioxide to carbon monoxide, which complements Lectrolyst's device). Multi-carbon products like those produced by Lectrolyst's device are typically produced from oil and natural gas processing and can also be generated from carbon monoxide through high-temperature, high-pressure reaction with hydrogen gas. Lectrolyst seeks to supplement the current production chain of these producers and reduce future cost variabilities related to oil, natural gas, and the possibility of carbon tax implementation at the global scale, rather than competing directly.

#### CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:

\$500,000 to bring the lab-scale prototype to a market-ready product. Lectrolyst will then partner with manufacturers to start production.

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:

Target time to revenue: 2 years (small-scale). Targeting full-scale installations within 5 years (\$1-2 million from each installation)

132 E. Delaware Ave., Ste. 100, Newark, DE 19711 www.lectrolyst.com team@lectrolyst.com

> Contact Greg Hutchings, Ph.D. President and Co-founder greg@lectrolyst.com (352)359-2956

Addressable Market Size: \$1.8 billion

Number of employees: 0 (2 co-founders)

Total Amount Invested to Date: \$78,000 (non-dilutive)



# MCET Technologies

#### **PRESENTER BIO:**

Dr. Thostenson is currently an Associate Professor in the Department of Mechanical Engineering at the University of Delaware and holds an affiliated appointment in the Department of Materials Science and Engineering. He is the co-founder of MCET Technologies established to develop smart textiles for novel sensing applications leveraging his lab group's expertise in nanotechnology and advanced materials. Professor Thostenson's research focuses on the processing and characterization of composite materials and textiles integrated with nanostructured materials towards the development of novel multifunctional applications.

#### **PRODUCTS / SERVICES:**

- Wearable sensor systems for clinicians for human motion analysis
- Developing multifunctional composites for customized applications in automotive and aerospace
- Conductive textiles for use as stretch sensors for DIY projects

#### **TARGET MARKETS:**

- Healthcare and biomedical devices
- Athletics and sports training
- Automotive and aerospace
- DIY websites

#### **TECHNOLOGY / DIFFERENTIATION:**

- Highly sensitive and accurate measurement of human motion and gait parameters
- Low-cost, flexible and comfortable to wear

#### **PATENTS:**

- Manufacturing Technique: US9776916B2
- Fabric Based Pressure Sensor: WO2018195295A2
- Textile Based Stretch Sensor: Invention Disclosure Filed

#### **COMPETITION:**

- Wearable sensors companies such as Teckscan and Dorsa VI
- Bertec Corporation, Kistler and other force plate manufacturing companies\



Flexible pressure sensors integrated with footwear for gait analysis



Stretch sensors with ultra-high sensitivity integrated into clothing for human motion analysis

Contact Dr. Erik T. Thostenson Co-founder thosten@udel.edu 302-831-8789

Number of employees 2 Total Funds Raised to Date \$150,300

# MesoMat

#### PRESENTER BIOS:

Paul Fowler and Sukhbir Kalirai are co-founders of MesoMat. Paul has an MSc in physics and extensive international research experience which helped lead to the development of MesoMat's core technology. Sukhbir has previous startup experience and an extensive background in operations, finance and developing businesses in nascent markets.

#### **PRODUCTS / SERVICES:**

MesoMat is an advanced materials company which has developed a proprietary plastic based wire that is able to conduct electricity even as it stretched like a rubber band. Our unique fibers and yarns are durable, stretchable and enable computing and sensing in numerous applications, including soft flexible electronics and circuitry. Furthermore, these fibers can act as lightweight sensors to monitor strain and mechanical failure when embedded within a material. Our technology is highly customizable and sensing and material parameters can be easily tuned.

#### TARGET MARKETS:

Diversified Chemical, Automotive, Aerospace

#### Stretchable Electronics Sensing Platform

- Smart materials
- Structural Health Monitoring
- - Flexible electronics Soft Robotics
- Intelligent CompositesWear Testing

#### **TECHNOLOGY / DIFFERENTIATION:**



#### PATENTS:

Multiple patents (PCT pending) covering both core technology including fiber material, production processes and technology applications.

#### **COMPETITION:**

For MesoMat sensing fibers, our competition is best classified through the technologies currently used in structural health monitoring. The most mature technology used is that of optical fiber Bragg gratings which can be obtained from many suppliers (Technica Optical Components, FemtoFibreTec GmbH, TeraXion, to name a few)

#### CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:

Raised US\$900k seed round (Mar'19) **Targets:** 1) Increase production by 500%, 2) Secure co-development agreement in SHM, 3) Secure \$100k in pilots and convert pilots into recurring revenue **Series A** financing in Q4'20

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:

MesoMat Financial Projections			
	2019	2020	2021
Revenue	\$250,000	\$1,200,000	\$3,200,000
COGS	45,000	150,000	240,000
Gross Margin	205,000	1,050,000	2,960,000
Salary	433,125	729,667	906,583
Office & Facility Costs	37,600	95,400	115,200
SG&A	76,800	127,200	153,600
NetIncome	(342,525)	97,733	1,784,617



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#### Contact

NAME: Paul Fowler & Sukhbir Kalirai POSITION: Co-Founder E-MAIL: paul.fowler@mesomat.com sukhbir.kalirai@mesomat.com PHONE: +1 289-241-5635

Addressable Market Size \$130B composite market

Number of employees

# Nanotech Industrial Solutions

#### **PRESENTER BIO:**

Dr. George Diloyan obtained PhD in Mechanical Engineering from Temple University with a focus on nanotechnology, electrochemistry and material science. He has extensive experience with applications of nanomaterials to solve sophisticated industrial problems, with nanoparticles processing mechanisms and has a successful track record of bringing new innovative products to market. Dr. Diloyan also holds two MS degrees in Computer Science and Thermodynamics.



#### **PRODUCTS / SERVICES:**

Commercial production of spherical multilayered particles of WS2 (IF-WS2) and nanotubes (INT WS2). Production and global sales of performance additives for automotive, petrochemical and metalworking markets. Active collaboration and joint development agreements with the industry leaders.

#### TARGET MARKETS:

Petrochemical: lubricants manufacturers (greases, oils, metal working fluids, cooling fluids). Polymers, composites and protective coating.

#### **TECHNOLOGY / DIFFERENTIATION:**

Unique shape and morphology of solids. Proprietary and commercial production process for powder and highly concentrated dispersions of IFWS2 in various liquids. NIS holds unique intellectual property including exclusive perpetual licenses and over 100 internally developed patents.



#### PATENTS:

9 patent families, that include total about 125 patents globally. Covers methods of production and applications

#### **COMPETITION:**

Our technology is unique. While a number of players produce performance additives based on legacy Sulphur-Phosphorus technology: Lubrizol, Afton, Infineum, Vanderbilt, etc. our technology offers unparalleled performance under extreme pressure and temperature conditions while extending lifetime of the moving parts and improving their surface quality.

#### CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:

Raising \$10 million equity round to fund sales and marketing required for the ramp-up.

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:

Year	Projected	Projected
	Revenue	Cash Flow
	\$'million	\$'million
2019	\$ 3.4	\$ (4.3)
2020	7.7	(3.9)
2021	15.5	Break Even
2022	29.6	5.5
2023	48.9	12.1

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> Contact George Diloyan CEO george@nisusacorp.com

Addressable Market Size: \$30B

Number of employees: 22

# Pliant Power Devices Inc.

#### **PRESENTER BIO:**

Tyler Schon, President and CEO of Pliant, completed his BSc at Western University (2012) and his PhD in chemistry at the University of Toronto (2017). He is an expert in battery materials and his PhD work forms the basis of Pliant's technology. He and his team have raised ~380k USD in grants, private investment, and contributions for Pliant. Tyler has 17 peer-reviewed publications and 3 patent applications.

#### **PRODUCTS / SERVICES:**

We sell our Electric Plastic materials and license our cathode slurry formulations to battery cell manufacturers. We perform joint development projects with end users, original equipment manufacturers (OEMs), and battery cell manufacturers to develop solutions for specific applications, leveraging the unique electrochemical and processing advantages of our materials. These solutions can range from improved specifications in one area of performance (ie cycle life), developing manufacturing solutions that decrease cost and increase reliability (ie dry electrode manufacturing), and developing new cell architectures that result in improved performance (ie thick electrode cells with decreased inactive materials).

#### **TARGET MARKETS:**

#### Beachhead Markets:

- Oil and gas (eg. deep well drilling)
- Telecommunications (eg. remote equipment power)
- Defense (eg. stationary power units)

#### Future Markets:

- Electric vehicles
- Aerospace

#### **TECHNOLOGY / DIFFERENTIATION:**





55 St. George Street, Suite 620, Toronto, ON, Canada M5S 0C9 416-697-8607 www.pliantpower.com tyler.schon@pliantpower.com

Contact Tyler Schon CEO tyler.schon@pliantpower.com 416-697-8607

Market size: 10.7B USD (2023)

4 full-time salaried employees, 6 part-time

Funds raised: \$37k dilutive, \$200k non-dilutive, \$150k in-kind services

Pliant has developed organic Electric Plastic cathode materials that are a replacement for metal-oxide cathodes in traditional lithium ion battery cathodes. Our materials are ½ the weight of current state of the art materials, have a lower cost of ownership for end users, and are very stable at high temperatures (do not degrade until above 200C). This allows them to be used in the next generation of lightweight lithium ion batteries and in high temperature conditions that current lithium ion technology cannot be used.

#### PATENTS:

- PCT/CA 2017/050114 (exclusive license from UofT)
- US provisional patent application 62/599,461 (rights still under negotiation)

### COMPETITION:

Company (material)	Cell Energy Graphite/ Solid-State*	Cycle Life	Safety
PLIANT (PCM*)	320 / 600 Wh/kg	Moderate-High	Excellent
Umicore® M UNHER / (NMC)	250 / 450 <u>Wh</u> /kg	Moderate	Moderate
JM Johnson Matthey A123 <sup>4</sup> Puted BYD (LFP)	125 / 190 <u>Wh</u> /kg	High	High
* Expected values			

#### **CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:**

#### <u>Ask</u>: 600k USD

Use of funds: Materials scale up process, product development.

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:



Output: MVP battery, pilot project

# Radical Plastics Inc.

#### PRESENTER BIO:

Kristin Taylor has over 25 years of experience in Business Development,
driving market adoption for engineering, commodity and biodegradable plastics.
Work experience: ExxonMobil, Metabolix, Sabic, Huntsman Corporation
Education: Masters Degree in Plastics Engineering, UMass Lowell

#### **PRODUCTS / SERVICES:**

Ambient soil and marine biodegradable plastic compounds to prevent plastics pollution in the environment. A game-changing solution to plastics pollution.

#### TARGET MARKETS:

Initial target market is soil degradable compounds for agricultural mulch film, a \$4B market. Larger goal is to expand this technology to a market where it can make the most difference - flexible packaging. Flexible packaging is a \$150B



business that has an urgent problem. Radical Plastics is offering an economically viable, drop-in replacement for conventional plastic.

#### **TECHNOLOGY / DIFFERENTIATION:**

Our patent pending technology involves blending conventional plastics with a proprietary, nontoxic, soil-enriching, natural catalyst based on fine mineral matter to make plastic compounds that are completely biodegradable in the natural environment.

The two-stage degradation process is enabled by: 1) A chemical phase - long polymer molecules are broken down to the smaller and more polar molecules by a free radical mechanism, and 2) A biological phase – natural microorganisms in the environment metabolically convert these molecules into biomass, CO2 and water.

Radical Plastics provides a cost-effective way to render most the most environmentally polluting plastics biodegradable in the natural environment. This technology promotes free radical degradation of these high-volume, commodity materials (e.g. polyethylene, polypropylene) versus the high temperature industrial composting required to biodegrade the majority of competing technologies (e.g. PLA, PBAT). The RP technology does not require manufacturing investment (CapEx) and does not suffer from the small scale and low manufacturing yields which are typical for bioplastics. RP plastics have superior mechanical properties, can be recycled with conventional plastics (vs. acting as a contaminate) and have better overall LCA. RP's natural catalyst is based on a by-product of the mining industry, currently accumulating as refuse and looking for utilization opportunities. Radical Plastics returns these lost minerals back to the soil!

#### PATENTS:

Non-provisional application "Utilization of Fine Mineral Matter in the Conversion of Non-Biodegradable Plastic and in Remediation of Soils Polluted with Non-Biodegradable Plastic" submitted to USPTO on March 6, 2019 (4 independent claims, 28 total. Fast track filing.)

PCT filing on March 7, 2019 (5 independent claims, 41 total)

#### **COMPETITION:**

Mater-Bi (Starch-based) Bio360 (Materbi/PBAT) BioAgri (Materbi/PBAT) EcoBio (BASF / Ecoflex/PLA)

# **CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:** \$1,300,000

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:



100 Cummings Center, Suite 451C, Beverly MA www. Radical-Plastics.com

> Contact Kristin Taylor CEO ktaylor@radical-plastics.com 1(617) 909-9032

Addressable Market Size \$4B agriculture \$150B flexible packaging

Number of employees 3

Total Amount Invested to Date \$60,000

# **RelīOx Corporation**

#### **PRESENTER BIO:**

Eric Johnson has a 20 year history of sales leadership, distribution and channel development as well as business development working with startups and publicly traded companies. He held leadership positions at Mobil and ExxonMobil, Armor Holdings, BAE Systems and many small business ventures, some public and some private. Eric is a distinguished military graduate from the United States Military Academy and has degrees in both General Engineering and Electrical Engineering.

#### **PRODUCTS / SERVICES:**

Chemical technology which allows for the immediate creation of pH neutral chlorine dioxide.

#### TARGET MARKETS:

Disinfection, sterilization, anti-microbial markets. animal care, food processing, material (hard & soft surface disinfection and deodorizing.

#### **TECHNOLOGY / DIFFERENTIATION:**

On demand pH neutral chlorine dioxide. First to market with technology that enables chlorine dioxide to be considered for everyday use in pathogen destruction.

#### **PATENTS: 6 US Patents.**

#### **COMPETITION:**

Current methods of disinfection using primarily alcohol, peroxide, peracetic acid, ozone UV, etc.

# **CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:** \$2,000,000

Funds required for:

- 1. Near term production, marketing and sales
- 2. FDA product certification
- 3. Product / business development activities & expenses

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:







747 SW 2<sup>nd</sup> Avenue, Gainesville, FL 32601 (904)-547-2970 ReliOx-clo2.com / VetiOx.com eric@reliox-clo2.com Contact Eric T. Johnson CEO eric@reliox-clo2.com (904)-547-2970 Addressable Market Size ≥ 18 Billion Number of employees 6 Total Amount Invested to Date \$766K

# RiKarbon, Inc.

#### **PRESENTER BIO:**

Dr. Basudeb Saha has 19+ years of experience in R&D, innovation, management and commercialization. Prior to his joining at the University of Delaware, he worked as a research scientist in polyurethane business R&D at the Dow Chemical Company and as a tenured faculty at the University of Delhi. He has published 100+ original research articles, 19 granted and filed patents, several book chapters and a book with Elsevier.

#### **PRODUCTS / SERVICES:**

RiKarbon is developing the next generation cost competitive conversion technologies for the transformation of non-conventional feedstock and intermediates into high value renewable products to serve domestic and international specialty and personal care products market.

#### TARGET MARKETS:

RiKarbon is targeting two markets of significant market fit for its products and having high growth potential. These are personal care products and environmentally-acceptable lubricants (EALs). Because of environmental regulations in Europe (REACH) and in USA, these markets for safer and nontoxic products are growing to meet consumers demand.

#### **TECHNOLOGY / DIFFERENTIATION:**

RiKarbon is commercializing an enabling technology to produce *bio-based base-oils and ingredients* (as potential replacement for cyclo-silicone compounds) for EALs and personal care products. Its atom-economic and green chemistry methodologies allowed the synthesis of products with tailored molecular architecture and tunable properties from sustainable sourced feedstocks of matured supply chain. Key advantages of Rikarbon's products are:

- Up to 100% bio-based carbon
- · Similar or superior specifications with reference to exiting products
- High performing and multi-functional characteristics
- Help formulators to create sustainability branding for products, and
- Mitigate regulation challenges

#### PATENTS:

Patent (WO/2019/036663; international patent application PCT/US2018/046965) was filed by University of Delaware Office of Innovation and Economic Partnership (OIEP). RiKarbon has received an exclusive license of the technology.

#### **COMPETITION:**

Few small, medium and large companies are developing technologies for EALs and alternate ingredients for personal care products. These companies in personal care product space are: Lubrizol, Innolex, Innospec, beiersdorf and others. In case of EALs, competitors are: Novvii, Panolin, RSC Biosciences, Renewable Lubricants, Kluber, BP Castrol, Gulf Oil Marine Ltd., Vickers, Aluchem Lubrificanti Speciali, Hydro-Safe Renewable and others.

#### CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:

\$1 million to expand R&D resources and accelerate product scale up capability to meet potential customers' and partner's growing demand for RiKarbon products to test in various formulations.

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS: To be presented



550 S. College Avenue Ste 107, Newark, DE 19716 www.rikarbon.com (will come live soon) bsaha@rikarbon.com

> Contact Basudeb Saha President bsaha@rikarbon.com (765) 237 7649

Addressable Market Size \$146 billion

Number of employees 2

**Total Amount Invested to Date \$210** 

# **SAS Nanotechnologies LLC**

**PRESENTER BIO:** Dr. Sumedh P. Surwade is the Founder and CEO of SAS Nanotechnologies. He has a Ph.D. in Polymer Science and has expertise in R&D and commercialization of specialty materials.

**PRODUCTS / SERVICES:** SAS Nanotechnologies has developed a patent pending microcapsule technology such that the microcapsules release chemicals inside them "on-demand" thereby opening unique solution opportunities to a variety of industrial problems in areas such as corrosion, food packaging sensor, drug delivery etc. The first target application ready for commercialization is anticorrosive coating. Our microcapsules based anticorrosive coatings are not only environmentally friendly but also self-healing i.e. the coating will heal and protect the metal from corrosion in case of scratch or mechanical damage on the surface.

**TARGET MARKETS:** Microcapsule technology can be developed and applied towards a broader market base, > \$100 billion. Our primary focus would be anticorrosive coatings, ~\$25 Billion market. We initially plan to target maintenance coating market for oil rigs (~ \$300 million) because of less stringent approval process and then expand further to other markets such as construction, marine, industrial etc.

**TECHNOLOGY / DIFFERENTIATION:** Our microcapsules are smart and get activated only in response to electrochemical potential change and therefore prevents false positive response. Also, our microcapsules can be incorporated in both aqueous and organic systems. The anticorrosive coatings developed using our microcapsule technology are not only heavy metal free but also prevent metal corrosion in case of scratch or mechanical damage on the surface.

**PATENTS:** (1) US Prov. Patent App., US 62/698,686, 2018. (2) US Prov. Patent App., US 62/798,145, 2019. (3) US Patent App. 20180362777, 2018. (4) PCT App. No. 2018/037796.

**COMPETITION:** Currently, there are few companies such as Autonomic Materials, Eoncoat, Synmatter etc. that are commercializing microcapsule based self-healing anticorrosive coatings. However, their mechanism of corrosion protection is different from ours and may not be as efficient as our technology. Self-healing anticorrosive coating technology is fairly new, and SAS Nanotechnologies will be a front runner if it successfully commercializes the technology.

#### CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:

Capital required: \$400,000

The funds will be used towards application development, commercialization and strategic partnership.

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:

Financials* (\$)	2020	2021	2022	2023	2024
Revenues	500	2,000	5,000	10,000	25,000
Expenditures	600	1,500	3,000	6,000	12,000
Net	(100)	500	2,000	5,000	13,000

\* In thousands (000) in USD – US Dollar



550 S College Avenue, Newark, DE 19716 214-235-1008 https://sasnanotechnologies.com sumedh@sasnanotechnologies.com

#### Contact

Sumedh P. Surwade Founder and CEO sumedh@sasnanotechnologies.com 214-235-1008

#### Addressable Market Size: \$25 Billion

Number of employees: 2

Total Amount Invested to Date: NSF SBIR Phase I: \$225,000 Angel Investment: \$75,000

# STF Technologies

**PRESENTER BIO: Richard Dombrowski** is co-founder of STF Technologies where he oversees operations and leads technical development of products using the company's proprietary shear thickening fluid technology. Richard is focused on the development of new products that promote improvements in health and occupational safety. He has achieved consistent revenue growth and profitability at STF Technologies while managing multi-disciplinary teams that developed and helped launch award-winning products. He has a Ph.D. in Chemical Engineering from the University of Queensland and a B.Ch.E. from the University of Delaware.

#### **PRODUCTS / SERVICES:**

- Textile finishes and treatments
  - Puncture, stab, and ballistic resistance
  - o Dynamic motion control/rate-responsive "smart" textiles
  - o Impact-resistant, damage-tolerant composite materials
- Rate-responsive fluids for dampers and motion control devices

#### TARGET MARKETS:

Protective equipment – body armor, surgical gloves, industrial gloves Specialty fluids – damping fluids, oil drilling, lubricants/power transmission fluids

#### **TECHNOLOGY / DIFFERENTIATION:**

Shear thickening fluid (STF) is liquid and flowable at rest, but instantly and reversibly transitions to solid-like behavior upon application of stress or impact. STF is added to a performance textile to create STF-Armor and provide protection against physical hazards while maintaining comfort and flexibility.

- STF-treated textile withstands 2x the puncture force and 4x the ballistic impact energy vs. the same fabric without treatment
- Enables "dual-natured" and "smart-responsive" materials that stiffen when needed but remain flexible otherwise
  - Flexible yet puncture-resistant materials for gloves (medical and industrial)
  - o Lightweight, flexible ballistic materials
  - Soft yet supportive sports bra
- STF fluid
  - Improves impact-resistance and damage tolerance of composites
  - Passive (non-powered) motion control devices
  - Highly effective and tunable damping and shock absorbing

#### **PATENTS:**

US7226878, 7498276B2, 7825045 – Advanced Body Armor Utilizing Shear Thickening Fluids. Multiple pending related to composites, treated textiles, and consumer applications.

#### **COMPETITION:**

Puncture-resistant materials and gloves: HexArmor<sup>®</sup>, Turtleskin®, performance textiles (e.g. Kevlar® Correctional)

Our advantage: STF-Armor is more flexible, lighter weight, more protective vs. conventional competitor materials.

#### CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:

Seeking commercialization/venture partners to develop and launch punctureresistant glove, personal protective equipment and/or body armor products. Current round: \$400k for prototype finalization and manufacturing development

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:

-STF Technologies 2019 revenues estimated at \$1.05 million -Achieved revenue growth every year since founding, CAGR of 39% to 2019 -Profitable operations in 4 of 6 years, and measured over lifetime of company -Projected surgical glove revenues (by year after launch):

Year 1: \$4.9MM Year 2: \$8.8MM Year 3: \$17.9MM Year 4: \$30MM



Contact Richard Dombrowski Co-Founder rddombrowski@stf-technologies.com Office: 302-318-2027 Mobile: 716-799-5935

> Address 18 Shea Way, Suite 101-102 Newark, DE 19713 www.stf-technologies.com

Industry Nanomaterials, textile finishes, composites

Number of employees 3

Founded May 2013

Addressable Market Size \$4 billion (Global surgical glove) \$600 million (US surgical glove)

**Total Amount Invested to Date** \$2.5 million via commercial partnerships, SBIR/STTR

# Tandem Repeat

#### PRESENTER BIO: Dr. Roger Anderson Ph.D., CEO

Roger brings over 20 years of experience in management, research, sales, marketing, and product development. Roger earned his BA in Biochemistry and Cell Biology from UC San Diego and his Ph.D. in Molecular Biology from the California Institute of Technology in 1995. His training as a scientist increased his analytical skills and ability to break a problem down to the fundamental elements. His industry expertise includes medical devices, diagnostics, pharmaceuticals, and Internet/e-commerce. He has been an executive in and fund-raiser for several startup companies. Roger has conducted business deals across the US as well as in Europe, Japan, and China.

#### **PRODUCTS:**

Squitex<sup>TM</sup>, a cloned self-assembling protein from Squid Ring Teeth (SRT) is the basis of our market-shifting technology. Our initial products are a novel fiber for standalone or blended fabrics and a series of textile adhesives that provide a natural and recyclable alternative to petroleum-based fibers and adhesives.

#### TARGET MARKETS:

Cotton Based Textiles Garment Manufacturing

#### **TECHNOLOGY / DIFFERENTIATION:**

TR Tech has developed a revolutionary technology combining fermentation and biosynthesis for the production of bioderived textiles with tunable properties in large quantities utilizing current economical processes (no need to rebuild manufacturing lines). The properties of the fibers and materials we can produce have a significant competitive advantage well beyond the lower cost of production:

•Squitex delivers improved mechanical stability, is self-healing (material can repair themselves with minimal intervention and improve their durability)

•Environmentally sustainable (reduces the need for microfiber removal from garments, reduces water needed, and so it reduces pollution and waste),

•Squitex physical and chemical properties are programmable (tunable mechanical, optical, and chemical properties)

#### PATENTS:

Our manufacturing, design, and methods are covered under 4 issued and 1 pending US patents.

#### **COMPETITION:**

Biosynthetic fibers are growing in importance. Large and medium size companies are focusing on bioplastic (e.g. PLA) based production, and start-ups are producing innovative solutions mostly based on silk or spider-silk. Focus on silk-based fibers, which have disadvantages due to high manufacturing cost (i.e., high molecular weight, and solution processing increases the production cost) has caused some issues for these companies.

#### CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:

\$1 million (minimal salaries, 90% is production and research) to launch the sewing-free adhesive to brands and designers around the world, to continue R&D of the adhesive and fiber for blended textile testing.

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:



# T A N D E M R E P E A T

3401 Grays Ferry Avenue Philadelphia PA 19146 +1 484.381.0504 www.tandemrepeat.com contact@tandemrepeat.com

> Contact Dr. Gozde Senel Ayaz Co-Founder & President senelayaz@tandemrepeat.com 14843810504

Addressable Market Size: \$60 billion

Number of employees 2

Total Amount Invested to Date 300K

Financial Highlights (\$000)	Y	ear 1	Y	'ear 2	Y	'ear 3	1	Year 4	1	Year 5
Revenue	\$	247	\$	1,970	\$	9,257	\$	21,799	\$	41,603
Operating Expenses	\$	533	\$	2,309	\$	4,826	\$	8,753	\$	14,274
Net Revenue	\$	(310)	\$	(603)	\$	2,735	\$	8,804	\$	18,546

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# TerraCOH, Inc.

#### **PRESENTER BIO:**

- 30+ years experience in leading companies and organizations to success; as CEO and General Manager
- · Grown organizations from zero to \$200+ million in revenue
- B.S. Mechanical Engineering & M.B.A.

#### **PRODUCTS / SERVICES:**

- Dispatchable, high capacity factor, baseload non-emitting electricity at low cost
- Grid-scale diurnal and seasonal energy storage
- Consumer of large quantities of CO2

#### **TARGET MARKETS:**

- · Project developers- electricity production and energy storage
- Wind and Solar operators
- Large emitters of CO2

#### **TECHNOLOGY/ DIFFERENTIATION:**

- Low cost, baseload, dispatchable power with no CO2 emission
- Turns CO2 from a liability to a resource for generating zero emission electricity
- Scale, flexibility, wide applicability, Q45 eligible,

#### **PATENTS:**

- 19 issued patents and 8 pending
- United States and targeted countries

#### **COMPETITION:**

- Other electrical generating technologies
- Other energy storage technologies

#### CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:

• Series A \$10-12 Million minimally viable pilot at a "controlled" test site

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:

• No revenue to-date: after pilot will license the technology for percentage of the revenue and will provide consulting services



#### 6125 Blue Circle Drive 612-201-6896

EMAIL http://www.terracoh-age.com Contact John P. Griffin CEO j.griffin@terracoh-age.com 612-201-6896

Addressable Market Size Multiple \$Billions

Number of employees 4

**Total Amount Invested to Date** 

\$750k

# ThruPore Technologies, Inc. At-a-Glance

ThruPore's Team:

Experienced, 70+ combined years

Dr. Franchessa Sayler -President, CEO & Chairman Led team through R&D, Product Development, & Mfg.

Dr. Trupti Kotbagi – Vice Pres. Of Technology

John Currie, MBA – Vice Pres. Of Sales & Marketing

#### **Board of Directors:**

**Christopher Melton** – CEO, The White Oak Group

Param Sreekanth – former DuPont Ventures executive

Glen Gaddy - Angel Investor, **Robin Hood Ventures** 

Mike Hahn - Angel Investor, Delaware Crossing Investment Grp

Industries: Petrochemicals, Fine & Specialty Chemicals, Materials

#### **Funding to Date:**

**\$1.4M** from National Science Foundation for R&D **\$850K** from Angel Investors

**IP Assets:** 2 Patents awarded for new materials and the use of material for catalysis. 1 Patent pending on the manufacturing process.

Contact: Dr. Franchessa Sayler Cell: 205-657-0714 franchessa@thrupore.com

#### Mission – Innovative Materials Company.

ThruPore was founded by a team of material scientists who developed a synthetic highly porous carbon material that can be applied in many high-value chemical applications. The

Team discovered that the porosity of the carbon produced 50x more accessible surface area compared to competitive carbons. Understanding this high-added-value, the Team focused its go-to-market strategy on new chemical catalyst products, vs. filtration or battery materials.

#### 1<sup>st</sup> Application Sector – *Disrupting Chemical Catalysts*.

Catalysts are the workhorses of all processes in the chemistry industry - refining, chemicals, gas processing, specialty polymers and more. Petrochemical manufacturers use tons of catalyst in each process for reactions that produce higher yields, produce a cleaner product, or last longer resulting in less downtime. The leading catalyst manufacturers --BASF, Johnson Matthey, Evonik -- are continually searching for new ways to increase surface area for their products, which drive process reaction performance. Catalysts are the critical technology that drives chemical process performance, and most chemical industry innovation revolves around catalyst technology.

#### ThruPore Catalysts - Dramatically Lowering Process Costs.

ThruPore's unique material enables differentiators for comparing catalysts. The 1st is enabling much more precious metal surface area, which drives up process performance. In catalyst metrics, this is higher activity, higher selectivity, & longer lifetime. Through testing, these 3 metrics translate into tens of millions of dollars of process cost improvement.

2<sup>nd</sup> – Testing has consistently shown that the nature of ThruPore's support translates into using a fraction of the precious metal to achieve similar performance. ThruPore is so confident regarding its value contribution that it is leading with a metrics-based business model.



#### ThruPore's Traction – Customer Pilots.

ThruPore developed its 1st catalyst in 2014 through an NSF R&D Grant. The Seed funding at the beginning of 2018 enabled commercial launch and manufacturing process development. ThruPore's sales & marketing execution in 2018 has resulted in 30+ leads within 9 months. ThruPore has the manufacturing operation to make and test pilot scale volumes today (1 ton) and has shipped samples to 30 customers for lab testing. ThruPore has been conducting tests and collaborating closely with 15 large chemical companies who are validating its value proposition of better performing catalysts.

#### Series A – Use of Funds.

ThruPore has launched and gone to market with under \$2.3M of total funding - an

incredible accomplishment for a chemical company. ThruPore has achieved 1st commercial revenues with its Seed round, which will resolve the major challenge of managing through the long customer sales cycle of certifying process catalysts. ThruPore is planning to secure a Series A round in Q1 2020 to scale its manufacturing operation to satisfy customer requirements. ThruPore has several large contracts (~20-50 tons/year) in its pipeline. Fulfilling these orders will require scaling our current unit operation as well as hiring critical staff to meet customer demands.

#### Growth – Platform Materials Company.

Catalyst opportunities represent a \$34 billion global market by 2024. ThruPore expects to achieve \$200M in revenue in 2024, with strong margins. Most catalysis innovators have been acquired at 3x EBITBA. With success in catalysts, ThruPore is positioned to easily expand its material "platform" into chemical adsorbents, zeolites, separations, and filtration products. Expanding into these related industrial chemical segments would add significant top-line revenue and products to its existing sales force, without adding much expense to launch.

	2019	2020	2021	2022	2021
Contracts	0	2	4	7	10
Revenue	\$100K	\$500K	\$6M	\$17M	\$29M
COGS	\$20K	\$100K	\$3.7M	\$11.1M	\$16.5M
Operating Costs	\$380K	\$400K	\$1.0M	\$2.1M	\$3.5M
EBITDA	(\$300K)	\$0	\$1.3M	\$3.8M	\$9M



# W7energy LLC

#### **PRESENTER BIO:**

Santiago Rojas-Carbonell is the COO of W7energy. Santiago holds a Ph.D. in chemical engineering, as well as an MBA. He has previously worked on two startups and has been responsible for the DOE ARPA-E funded project that led to the development of the materials currently being commercialized by W7energy.

#### **PRODUCTS:**

W7energy offers hydroxide exchange membranes and ionomers for the fuel cell and electrolyzer markets. Our materials enable 33% savings in system cost and offer 10+ times more durability than competitors on the market.

#### **TARGET MARKETS:**

Fuel cell cars manufacturers, electrolyzer manufacturers, research laboratories

#### **TECHNOLOGY / DIFFERENTIATION:**

W7energy's hydroxide exchange membranes and ionomers have demonstrated far superior performance and durability than current commercially available products. With this high conducting and robust HEM, car manufacturers can build fuel cell system with cheaper materials and  $H_2$  gas stations can build electrolyzers for clean, pure and highly efficient  $H_2$  production.

#### **PATENTS:**

Our technology is protected by six exclusively licensed patents, one of which is already allowed in the USA. The patent protection is currently being nationalized in 11 additional countries.

#### **COMPETITION:**

Hydroxide exchange membranes: Fumatech GmbH, Dioxide Materials Proton exchange membranes: W.L. Gore & Associates, Inc

#### CAPITAL REQUIRED AND USE OF FUNDS THIS ROUND:

W7energy is seeking for \$5MM to be used in the development of electrolyzers, as part of a downstream integration process.

#### FINANCIAL SNAPSHOT / REVENUE PROJECTIONS:

Year	2019	2020	2021	2022	2023
Revenue (\$)	116	1,581	2,160	10,512	15,684
Gross margin(\$)	(1,439)	944	1,249	8,588	12,688
EBITDA (\$)	(2,106)	268	563	7,600	11,388



DuPont Experimental Station E500-2404A 200 Powder Mill Rd PO Box 8354 Wilmington, DE 19803

> Contact Santiago Rojas-Carbonell COO Santiago@w7energy.com 505.814.8369

> Addressable Market Size \$32.4 billion

Number of employees 3 Total Amount Invested to Date \$120k



### **Charles Paul**

Henkel Adhesive Technologies

Dr. Charles W. Paul, Vice President – Technology, Henkel Adhesive Technologies, is responsible for technology assessments for M&A and Venturing, and supports Open Innovation within North America for the R&D teams.

Since joining Henkel in 1988 he has held a number of positions within R&D. His experience covers almost all categories of adhesive and wide ranging applications: from jet engines to hair spray, polyimides to starch. Chuck holds over 50 US patents and coauthored numerous publications including five book chapters on adhesives.

Chuck has a BS in Chemical Engineering from Cornell University and a PhD from the University of California at Berkeley, College of Chemistry.

### **Charles Roe**

AlgiSys, LLC

Dr. Roe is a serial entrepreneur and presently serves as the Chief Technology Officer (CTO) of AlgiSys, a biotechnology company that he co-founded in 2009. Since its inception, AlgiSys has raised \$6.7MM in private and non-dilutive capital, and developed patented technology to manufacture omega-3 nutritional oils and high protein additives for use in the supplement, food & beverage, animal feed, aquaculture, and pharmaceutical industries. Prior to AlgiSys, he co-founded and served as the CTO for Biofuel Producers of America (dba Algae Producers, Inc.), a diversified algae products and biofuels company.

Dr. Roe was previously an R&D Consultant and Program Manager with NineSigma, a technology and innovation sourcing company with offices in the United States, Europe, Japan, and South Korea. At NineSigma, he worked with the research and development organizations of Fortune 500 and Global 1000 corporations, and helped to identify, procure, and develop strategic technologies on a global basis. Dr. Roe's projects consistently focused on identifying gaps in his client's technology platforms, brokering technology exchanges, and establishing external research and development (R&D) partnerships. He has expertise with emerging technologies across a wide range of industries: automotive, petroleum, chemical, energy, pharmaceuticals, consumer products, electronics, food & beverage, agriculture, packaging, paints & coatings, textiles, and polymers. In addition to his expertise with R&D, he has also worked in a variety of other functional capacities that include management, product development, engineering, corporate purchasing, recruiting, supply chain/logistics, six sigma, and corporate quality with such companies as ICI, The Glidden Company, and General Electric.

Dr. Roe received his Ph.D. in Chemical Engineering from Michigan Technological University, his M.S. in Chemical Engineering from the University of Pennsylvania, and his B.S. in Chemical Engineering from the University of Pittsburgh. Additionally, he earned a Certificate in Pastoral Counseling from The Institute of Pastoral Counseling at Emerge Ministries, Inc. in Akron, Ohio.

### Wayne Tamarelli

AWT Private Investments

Wayne Tamarelli is a bi-coastal angel financier of early stage technology businesses in greater New Jersey and San Francisco Bay areas.

CEO, entrepreneur, private company owner, and public company officer. His experience includes general management, entrepreneurship, ventures, M&A, R&D, advanced materials, electronics, environmental protection, specialty chemicals, energy conservation, health care, technology transfer, and other business, scientific and policy areas.



### **KEYNOTE SPEAKER BIOGRAPHY**

### Vanessa Chan

University of Pennsylvania

Dr. Vanessa Chan is an Entrepreneur, Board Member, Angel Investor, Keynote Speaker and Educator who has spent over 20 years innovating. She is a leading thinker in innovation & entrepreneurship where she thrives at the interface of technology and business. She is currently at the University of Pennsylvania, where she is a Professor of Practice in Innovation and Entrepreneurship in the School of Engineering and Applied Sciences, the Undergraduate Chair of Materials Science & Engineering and a member of the Executive Committee for Penn Health Tech. Prior to Penn she was a McKinsey & Company partner, where she co-led their innovation practice and helped corporations with deep R&D portfolios, commercialize their technologies. After McKinsey, she invented consumer products, and competed on the Today Show's Next Big Thing which led to her as a guest on QVC, selling her invention, Loopit (tanglefree headphones).

Vanessa is a renowned speaker who inspires others to embrace failure as a catalyst for change. She emboldens people to adopt a growth mindset in corporate led innovation projects, their career and their personal life. The latter comes from being half of a dual-income family where she and her husband both have intense, highprofile careers but have integrated their work-life to also be present and engaged parents. Vanessa's journey has been covered in various news outlets including the WSJ, The Washington Post, a best-selling book (I Know How She Does It), CBS and various podcasts including "Women Killing It!". You also can find her very well received 2018 Penn Engineering Commencement speech at www. failingislikefarting.com.

Vanessa is passionate about helping the Philadelphia ecosystem and does so as the co-President of the Philadelphia Chapter of Ellevate Network, as a partner in Robin Hood Ventures (an angel investing group), as the chair of the BRIC (Business Resource Innovation Center) for the Free Library of Philadelphia and as a member of the Board of Directors for the Kimmel Center. She also is on the Advisory Boards for three start-ups: Charge-it-Spot, Girls Auto Clinic and Simply Good Jars and a founding member of the Innovation Business Development Advisory Council for United Technology Corporation. Her passion for education extends into K-12 as an active Trustee for Springside Chestnut Hill (SCH) Academy, where they have developed a design-thinking based curriculum including a Venture Incubator for kids.

Vanessa earned a Ph.D. from MIT and a B.S.E from the University of Pennsylvania. She is married to Mark van der Helm, the head of Energy, Waste and Facilities Maintenance at Walmart and they have two school-aged daughters.

### **INVITED SPEAKER BIOGRAPHIES**

#### Jay Amarasekera SABIC Ventures

Dr. Jay Amarasekera is a Senior Technology Manager attached SABIC Ventures, the corporate venture arm of Saudi Basic Industries Corporation which is one of the world's top diversified chemical company. Prior to this role, he served as the Technology Manager for Performance Chemicals and Innovative Plastics business units of the company. Before SABIC, Jay served in many managerial positions in General Electric's former Plastics and Silicones businesses both in USA and China. Prior to joining GE, Jay worked as a Research Scientist in BASF Corporation's Colorant & Coatings and Performance Chemicals divisions. Jay holds a PhD in Inorganic Chemistry from University of Illinois at Urbana Champaign, USA.

#### **Charles Andres**

Wilson Sonsini Goodrich & Rosati

Charles Andres, Ph.D., RAC, is an associate in the Washington, D.C., office of Wilson Sonsini Goodrich & Rosati. He focuses on patent prosecution, strategic patent counseling, IP due diligence, drug and medical device FDA regulatory counseling, invalidity and non-infringement opinions, life-cycle management, Supreme Court and Federal Circuit amicus briefs, and related business matters. Charlie has significant experience drafting patent applications, prosecuting patent applications in the U.S. and abroad, and evaluating the claims of issued patents. He has won cases before the Board of Patent Appeals and Interferences by brief and on oral argument. Patents Charlie has obtained have been listed in the Orange



Book and asserted against a generic pharmaceutical manufacturer, and he has drafted and filed multiple applications for patent term extension. Companies he has obtained patents for have been sold for a cumulative total of approximately \$4 billion.

Charlie has also drafted and prosecuted patents covering three FDA approved drugs. He represented a client at a U.S. Senate HELP Committee full hearing on electronic health records and was part of a team that defended a generic pharmaceutical manufacturer in an Actavis reverse payment enquiry at the Federal Trade Commission.

In addition, Charlie has authored and reviewed numerous freedom-to-operate, invalidity, and non-infringement opinions, including opinions supporting Paragraph IV certification for ANDA filers under the Hatch-Waxman Act. He has advised companies on the use of post-grant U.S. Patent and Trademark Office proceedings to achieve IP goals. Prior to becoming a patent professional, Charlie spent a decade as a medicinal chemist and early-phase project co-chair at Bristol-Myers Squibb Company, where he won a Presidential Award, among other accolades. He holds Regulatory Affairs Certification (RAC) from the Regulatory Affairs Professionals Society.

#### **Eric Breese**

#### Evonik Venture Capital

Eric Breese is an Investment Manager at Evonik Venture Capital. His responsibilities include deal sourcing, investment due diligence, strategy development, and portfolio company support. He serves as a Board Observer for a portfolio company. He brings a strong financial foundation to evaluating opportunities with strategic relevance to Evonik. Eric joined Evonik in 2006 and has held positions in Germany and the U.S. within the Advanced Intermediates Business Unit and Corporate Finance. Prior to his current role, he served as Director Innovation Americas leading the global external growth activities for the business unit. Successful projects in Asia, Europe and the Americas resulted in acquisitions, relationships with startups and growth stage companies as well as university research projects supporting external growth of the Business Unit.

Before joining Evonik, Eric worked held various positions including Chief Administrative Officer (legal), Vice President of Operations/Controller (high-tech & services) and consulting. His professional career began with 8 years in Public Accounting working in Certified Public Accounting and Consulting firms.

### **Neil Cameron**

#### Emerald Ventures

Based in Emerald's Toronto office, Neil Cameron's sector expertise is in the field of advanced materials and processes. As an Investment Director, he is involved in all phases of the investment process: sourcing, evaluating, selecting and supporting novel sustainable technology start-ups from early diligence to exit. At Emerald, Neil has Board and committee responsibilities at Phase Change Energy Solutions, Tropic Biosciences, Lucintech and elsewhere in the portfolio.

Prior to joining Emerald in 2006, Neil was a project leader and staff scientist with the National Research Council of Canada (Industrial Materials Institute), was a Research Associate at McGill University and has consulted on technical and IP issues. Projects have included work in nanotechnology, high-fidelity micro- & nanofabrication, polymer synthesis & applications, industrial biotechnology, petrochemistry, interfacial interactions, supramolecular chemistry, composite materials and he is the co-inventor of a patented water-purification resin.

Neil holds a Doctorate in Chemistry from McGill University and a Bachelor of Science in Chemistry and Biochemistry from the University of King's College (Dalhousie University). Neil is fluent in English and French.

#### **John Carlisle**

Argonne National Laboratory

John Carlisle is a physicist and entrepreneur with a strong passion for translating fundamental discoveries into disruptive products.

As Director of Chain Reaction Innovations, John's focus is on supporting the next generation of innovators to move hardware-based energy technologies into applications with high societal and economic impact. CRI enables the innovator and their innovation to leverage the extensive resources within Argonne National Laboratory for two years. The long term vision is to more effectively translate high-risk technologies into the market while also enabling a new generation of entrepreneurs to create new businesses that will keep the US at the forefront of energy innovation.

John re-joined Argonne in 2016 after working for more than 15 years as Co-Founder and CTO of Advanced Diamond Technologies, which spun out of Argonne in late 2003. In ADT he developed and brought to market four distinct product families based on a new synthetic diamond coating technology he co-developed at Argonne, ultrananocrystalline diamond (UNCD). ADT today is profitable, growing aggressively, and the world leader in thin, smooth diamond coatings for industrial, semiconductor, nanomanufacturing, and water treatment applications. Launching ADT involved re-imagining the process of technology transfer at national laboratories, which enabled bench scientists to become equity founders of companies to actively help to commercialize their discoveries. The template he helped to establish has since been used as a model for other U.S. Department of Energy labs in the U.S. He and several others were recognized by the Federal Laboratory Consortium in 2006 for this achievement.

John holds a Ph.D. in Physics from the University of Illinois at Urbana-Champaign. He has more than 240 publications in peer-reviewed journals and given numerous invited talks at international conferences. He has performed seminal work in several fields in condensed-matter physics and materials science, including surface physics, soft-X-ray synchrotron radiation, and synthetic carbon materials. He is a recognized world leader in the science and technology of synthetic diamond thin films.

### **Andrew Cottone**

#### Adesis

Andrew Cottone, Ph.D. is the President of Adesis, a position he has held since 2016, when the Company became a wholly-owned subsidiary of Universal Display Corporation (Nasdaq: OLED). Andrew joined CB Research and Development (the predecessor of Adesis) in 2001 and co-founded Adesis in 2005. Trained as an organometallic and process chemist, Andrew's breadth and depth of experience encompasses 5 years of industrial experience as a process chemist, ten years as a technical manager, twelve years as an entrepreneur/business founder, and fifteen years as a business executive. As a research manager, he has been responsible for as many as 40 chemists with expertise in physical chemistry, organometallic chemistry, analytical chemistry, and organic chemistry. As a business executive/owner, Andrew has charted and steered the vison and growth of Adesis over the past 15 years and is responsible for greater than 100 Adesis employees across multiple sites.

Andrew graduated from La Salle University (Philadelphia, PA) in 1996 with a dual-bachelor's degree in chemistry and biochemistry and received his Ph.D. in organometallic chemistry in 2000 from the University of Florida under the joint mentorship of Professors Dr. Russell S. Drago and Michael J. Scott. His doctoral research experience of substrate-metal complex interactions has provided insights into new reactions for preparative scale functionalization of azoles. Andrew completed a post-doctoral position under Dr. Charles Riordan at the University of Delaware, and then embarked on a dual science and business career under the mentorship of Dr. Charles Beard. His personal passions include family, process chemistry, and all things Philadelphia.

### **Steve Dubin**

SDA Ventures, LLC

Mr. Dubin is a Principal in SDA Ventures LLC, a firm focused on assisting emerging growth, middle-market and multinational companies, primarily in the health & wellness, nutritional products and food services markets, on matters including corporate development, business acquisition, customer relations, growth strategies and corporate finance. Mr. Dubin, in conjunction with SDA Ventures, LLC, acts a Senior Advisor to Paine Schwartz Partners, a global private equity investment firm located in New York, and San Francisco, helping Paine to identify and execute investment opportunities in the global human and animal food and nutritional products industries. In addition, Mr. Dubin is a member of the boards of Alcresta, Inc. and the UCAN Company.

Mr. Dubin was the Chairman of Enzymotec Ltd (Nasdaq:ENZY), a leading global supplier of specialty lipidbased products and solutions technologies from January 2014 until its acquisition by Frutarom Industries in January 2018. Enzymotec developed, manufactured and marketed



innovative bio-active lipid ingredients, as well as final products, based on sophisticated processes.

Prior to his co-founding of SDA Ventures in 2011, Mr. Dubin served as the CEO of Martek Biosciences Corporation (NASDAQ: MATK), a leader in the innovation, development, production and sale of high-value products from microbial sources that promote health and wellness through nutrition. Mr. Dubin played a key role in developing Martek's business from an R&D company to a fully integrated, profitable, commercial organization with over \$470 million in annual sales. He served in a variety of positions with Martek over the 14 years before his election as CEO in July 2006, including President, CFO, Treasurer, Secretary, General Counsel and Senior VP of Business Development. He also led Martek's initial round of institutional financing in 1986. Mr. Dubin's other experience includes working with and financing a variety of early-stage technology companies and spending 12 years in various positions at Suburban Bank, now part of Bank of America, including Vice President and Treasurer of its venture capital subsidiary.

Mr. Dubin graduated from the University of Maryland, College Park, where he studied business and accounting. He received his Juris Doctor Degree from the National Law Center at the George Washington University in Washington, D.C. Mr. Dubin is a licensed CPA and a member of the Maryland Bar. Mr. Dubin's non-profit activities include his service on the Board of Visitors of the University of Maryland Children's Hospital as well on the Board of Visitors of the University of Maryland Baltimore Foundation.

### **Greg Fleming**

Air Liquide Venture Capital

Greg Fleming is an Investment Director within Air Liquide Venture Capital – ALIAD. ALIAD is a strategic venture investor supporting collaborations between Air Liquide business units and emerging technology companies. Prior to ALIAD, Greg held a number of positions within Air Liquide including Director of the Air Liquide Corporate R&D Innovation team in Paris and Deputy Director of the Air Liquide Research Center in the US (Delaware Research and Technology Center). Greg has considerable experience in leading technology teams from product development to commercialization.

### Judith Giordan

### ecosVC

Judith Giordan is a co-founder of the Chemical Angels Network (www.chemicalangels.com) , Managing Director of ecosVC, Inc. (www.ecosvc.com) , professor of Practice at Oregon State University, a former Fortune 100 executive and an entrepreneur. Judy serves as board member, cofounder, advisor and investor in seed and early stage STEM aligned startups.

Her previous executive positions include Corporate Vice President and Officer/Global Director of Research and Development at International Flavors and Fragrances, Inc.; Vice-President Worldwide Research and Development for the Pepsi-Cola Company; Vice President Research and Development/Corporate Officer, Henkel Corporation, the North American operating unit of the Henkel Group. She has also held management, program leadership and technical contributor positions at Polaroid and ALCOA. Examples of venture leadership and Board roles include 1ExecStreet and Qteros.

Judy has served on Boards at the National Research Council and at the National Science Foundation where she has been a member of the Math and Physical Sciences Directorate Advisory Board, Member of the Chemistry Division Advisory Board, Member and Chair of the Waterman Award Committee, Member of External Visiting Committees, and as Program Director for the IGERT Program.

Active in Professional Societies, examples include as a member of the Board of Directors, Committee Chair and Program co-chair at the Industrial Research Institute and the American Chemical Society; a member of the advisory group of and program leader for the Conference Board technical conferences, Educational Foundation Trustee at the Commercial Development and Marketing Assoc., and speaker and program organizer at the Angel Capital Assoc. Judy's honors include ACS Fellow, ACS Garvan-Olin Medalist, ACS Henry Whelan Award for Management



Leadership and Alexander von Humboldt Networking Award recipient. Judy has been selected as theme chair for the 2020 ACS National Meeting to be held in San Francisco – "From Bench to Market".

Judy has a BS in Environmental Science and VoTech Agriculture from Rutgers University; PhD in Chemistry from the University of Maryland; and was an Alexander von Humboldt post doctoral fellow at the University of Frankfurt, Germany.

#### **Edward Greer**

Dow Chemical Company

Edward is member of the Scouting & Exploration Network in Dow's Ventures and Business Development group.

In this role, Edward is responsible for finding and evaluating technologies and opportunities that complement Dow's robust Research & Development pipeline and have the potential to contribute to the Company's long-term success. Dow seeks innovations that extract value from the intersection of chemical, physical, and biological sciences to help address many of the world's most challenging problems such as the need for clean water, clean energy generation and conservation, and increasing agricultural productivity.

Edward joined Rohm & Haas in 1982 as a senior scientist in Analytical Research where he was promoted to manager prior to moving into Computer Applications research. He then transitioned to Corporate Exploratory research followed by Corporate Development. Edward has extensive experience in research management, market development, and business development for the Electronic Materials and Advanced Materials markets. He has contributed to advancements in ceramics, displays, organic electronics, optical disks, photovoltaics, and microwave devices.

Edward earned a B.S. in Chemistry with Honors from the University of North Carolina at Chapel Hill and his Ph. D. in Analytical Chemistry from the University of Wisconsin-Madison. He holds a Certificate of Professional Development from the University of Pennsylvania's Wharton Executive Education program. Edward is a judge for numerous business plan competitions, and serves on the advisory boards of the Cornell Center for Materials Research and the New York State Energy Research and Development Authority's Proof of Concept Centers.

#### William Grieco

RAPID Manufacturing Institute

William (Bill) Grieco is the Chief Executive Officer of AIChE's RAPID (Rapid Advancement in Process Intensification Deployment) Manufacturing Institute.

Prior to joining RAPID, Bill was the Vice President of Energy & Environment at Southern Research, a 501(c)3 nonprofit research institute in the Southeastern U.S., where he implemented strategies to transform and grow the business from one serving only the fossil energy sector to a boutique innovation testing, development, and consulting organization focused on reducing the environmental footprint of energy generation and chemicals production. Among his key accomplishments were building new businesses in photovoltaics and energy storage, growing a sustainable chemistry and process development group and readying multiple technologies for licensing, and developing a public-private partnership to foster innovation-based economic development in Alabama. Prior to joining Southern Research, Bill spent five years leading innovation and technology for Owens Corning, the building materials and composites company. Earlier in his career, Bill was Managing Director and CTO of Gardenia Ventures, an innovation commercialization and consulting firm. For ten years prior to leading Gardenia Ventures, Bill held senior level innovation roles, primarily focused on process development across multiple industries.

In addition to these roles, Bill serves on the external advisory board for Florida Solar Energy Center and has been an active member of AIChE for 25 years. He holds a PhD and Master's degree in Chemical Engineering from Massachusetts Institute of Technology and a Bachelor's degree in Chemical Engineering from Georgia Institute of Technology.



### Jacob Grose

BASF Venture Capital

Jacob E. Grose, Ph.D. is an Investment Manager for BASF Venture Capital, where he heads the Boston office. He is a board member for NBD Nanotechnologies and a board observer for Provivi. He is responsible for making strategic minority investments that bring value to BASF and the greater community. Previously, Jacob worked for BASF New Business, where, among other projects, Jacob scouted and led BASF's strategic partnership with EnerG2 Technologies. During this time, he was involved in the negotiations, due diligence, and subsequent integration for BASF's acquisition of EnerG2 in 2016. Prior to joining BASF in 2012, Jacob was a Senior Analyst at Lux Research, a boutique independent research and advisory firm, providing strategic advice and ongoing intelligence on emerging technologies. Jacob received his Ph.D. in physics from Cornell University and his B.A. in physics from Harvard University. He is the author of nine peer-reviewed scientific articles in the areas of organic electronics and novel superconducting and magnetic materials.

### Laurence Hayward

Independence Equity Venture Fund

Laurence Hayward is a founding partner of Independence Equity, an early-stage venture fund focused on resource efficiency. Hayward is co-founder of Cornerstone Angels, which has invested in more than 60 companies since 2006, and founder/CEO of VentureLab. Previously, Hayward was President of Vcapital.com, an early version of equity crowdfunding. Vcapital was acquired in 2002 by a NYbased investment bank.

Hayward led global marketing for the Emerging Company Services practice of Arthur Andersen. He was appointed to represent the firm at the World Economic Forum in Davos, Switzerland in 1996. Hayward serves on the Boards of several portfolio companies. He is a graduate of the Joint MBA/BS program at the University of Illinois and holds Series 7 and 63 licenses.

#### Frank Klemens DuPont Ventures

Frank is the Managing Director of DuPont Ventures (Concurrent with Director of Licensing) in the areas of Nutrition & Health, Industrial Bio Sciences, Electronics & Imaging, Safety & Construction, and Transportation & Advanced Polymers. He works closely with the DuPont businesses to capture new and strategic opportunities primarily in the Specialty Chemical areas (IoT, machine learning, biotech, food, beverage and supplements that address digestive, metabolic and cardiovascular health, as well as specialty food protection, electronics and imaging, and construction and transportation solutions). Prior to this role he was a Director of Licensing (inlicensing and outlicensing) of technology in the Ag and Nutrition technology space. Also at DuPont, he was a budget and project manager as well as a regulatory analytical scientist in Crop Protection. He has been with DuPont 27 years. Frank is on the Board of Directors for Philadelphia-Israel Chamber of Commerce (PICC). Frank received his PhD and Master's degree from Purdue University in the area of Bioinorganic Chemistry. He received his Bachelor of Science degree in Chemistry from John Carroll University in Cleveland OH.

### **Michael Krel**

#### Sofinnova

Michael joined Sofinnova in 2013 and has been involved in the investment activity of the Sofinnova Green Seed Fund and Sofinnova Capital funds and Sofinnova IB 1 fund, a 125 million euros fund dedicated to the decarbonization of the chemical industry. He is an observer on Comet Biorefining board. He was the acting CEO of EnobraQ at the very beginning of the company, and remains a board member since a new CEO has been hired.

Prior to Sofinnova, Michael spent two years as VP Business Development at Deinove, a biotech company developing second generation biofuels and biochemicals. Before that, Michael was a Business Development Manager at Metabolic Explorer, a biotech company focused on the development of processes and products in renewable chemistry, where he contributed to the development of industrial projects, particularly in Asia. Previously, and after his PhD in chemistry, Michael helped to



develop a consulting company focused on strategic and organizational issues in scientific and technical environments, where he worked with major French energy and materials industrial groups

#### **David Mackanic**

#### Dorm Room Fund

David is currently an Investment Partner at Dorm Room Fund, a student-run venture capital firm backed by First Round Capital. David's investments span all sectors, but he is particularly focused on investing in materials and energy companies. David is also an Accel Innovation Scholar at Stanford, and was previously the President of the Stanford InSITE Fellowship, an organization that brings MBAs and engineers together to work with local startups and VCs. He is currently a Chemical Engineering Ph.D. Candidate at Stanford, where he researches the intersection of electrochemical energy storage and polymer science. Specifically, David aims to develop robust, flexible, and stretchable battery materials for applications in wearable electronics and soft robotics. He is supported by the NSF Graduate Research Fellowship and the Chevron Stanford Graduate Fellowship. Prior to graduate school, David received his B.S. in Mechanical Engineering and B.A in Chemistry from Virginia Tech.

#### **Ray W. Miller**

#### Verdecute Consulting

Mr. Miller joined DuPont in 1972 after earning his Chemical Engineering degree with highest honors from Georgia Tech. After numerous assignments in chemicals, polymer intermediates and downstream polymer businesses, in 1990 Mr. Miller was named Technology Manager, DuPont Nylon Enterprise.

In 1995, Mr. Miller launched Sorona<sup>®</sup> Triexta, which later became the first DuPont polymer platform to use a biobased raw material. He also initiated joint development programs with Genencor and Tate & Lyle, which led to commercialization of Bio-PDO<sup>\*</sup>. In December 2002, Mr. Miller was appointed Program Director, Biorefinery Development. He led a consortium of partners in a \$38MM DOE program which created the technology for the Nevada, lowa cellulosic ethanol plant. In May 2005, Mr. Miller organized and launched a bio-based performance polyols business, DuPont Cerenol<sup>®</sup>. In June, 2010, Mr. Miller was named Global Business Development Manager, Biomaterials and Specialties, a position he held until his retirement from DuPont at the end of December, 2011.

On May 14, 2012, Mr. Miller was named Chief Business Officer at Verdeyzne, Inc., a small, innovative biomaterials company located in Carlsbad, California. At the end of 2015, he retired from that position, but consulted for them until July, 2016.

During this period, he launched a sole proprietorship consulting company, Verdecute Consulting, and he continues to serve as a senior advisor on several boards, including the Delaware Sustainable Chemistry Alliance (DESCA) and until recently the Center for Bioindustrial Renewable Chemicals (CBiRC). Mr. Miller was inducted into the Georgia Tech Academy of Distinguished Engineering Alumni in 2001. He was part of the joint DuPont/Genencor team that received the 2003 EPA Presidential Green Chemistry Challenge award for "Microbial Production of 1,3-propanediol". He was recognized by DuPont with 5 corporate excellence awards, including the prestigious Bolton-Carothers Award for the development of Sorona® and the Sales and Marketing Excellence Award for successfully petitioning the FTC to obtain the new subgeneric designation "triexta" for PTT fibers. Mr. Miller is an inventor of 8 issued patents, has published 5 journal articles and has made numerous presentations to conferences on bio-based materials and bio fuels.

#### **Christina Pellicane**

#### University of Delaware Horn Entrepreneurship

Christina Pellicane is the Director of Commercialization Programs for the Horn Entrepreneurship Center at the University of Delaware. In this role, she manages several initiatives including a \$2M Proof of Concept program, the Horn Venture Mentoring Service and the UD I-Corps Site. Christina is also an independent consultant through her company Antevasin with projects including the U.S. Department of State's Global Innovation through Science and Technology with VentureWell and The New York Academy of Sciences' NYSERDA Proof of Concept Center Metrics and Evaluation Project. She is a nationally certified NSF I-CorpsTM Instructor and Lean Launchpad educator at schools and incubators around the world.

Previously, Ms. Pellicane served as the Executive Manager of the NYC Regional Innovation Node, funded by the NSF for \$3.74M, as the northeast NSF I-CorpsTM Node led by CUNY in partnership with NYU and Columbia. She also served as CUNY's manager of the PowerBridgeNY program, funded by NYSERDA for \$10M. Prior to this, she held positions as a Clinical Business Administrator and Study Monitor at a veterinary clinical research organization, AlcheraBio, and a Research Associate at a biotech startup, Venenum Biodesign.

Ms. Pellicane holds a B.S. in Biology and Animal Science from the University of Georgia and a Master of Business and Science with a concentration in Biotechnology and Genomics from Rutgers University.

### **Rajeev Prabhakar**

A.T. Kearney

Rajeev Prabhakar is a Principal at A.T. Kearney and a member of the firm's global Chemicals practice. He works with clients on a range of topics including Strategy, M&A and Operations. He has worked with a number of private equity firms on acquisitions in a number of areas including flexible packaging, polymer additives, capital equipment, fertilizers etc.

Rajeev earned a PhD in Chemical Engineering from the University of Texas at Austin and an MBA from the Wharton school. Prior to joining A. T. Kearney, Rajeev worked in technology and business leadership roles in the chemical industry.

### **Marc Privitera**

PreProcess, Inc.

Marc develops technology, leads projects and builds companies. A chemical engineering leader for 30 years, routinely recognized as the go to guy for getting the job done. His infectious enthusiasm and passion for excellence drives innovative applications to commercialization. With a positive attitude, the "we will find a way" mantra comes to life. He has spent time in the corporate world and now successfully delivers in the fast paced world of venture capital funded entrepreneurial efforts. From billion dollar chemical mega projects to the initial throws of a new start up delivering first in the world applications, Marc has delivered a wide variety of chemical engineering success. Having pitched on Sand Hill Road, the mecca of venture capital in California, he has taken complex technical systems and refined them into simple investment explanations in the board room. As an innovator, and inventor, he has developed multiple products and processes giving him eight US patents. Projects have included agricultural processing, consumer products, biofuels, rare earths, lithium, industrial hemp, many other critical materials. Marc is a California Registered Professional Engineer: Chemical CH6543 and Control Systems CS7166

### William Provine

Delaware Innovation Space

Dr. William D. Provine is a founder and serves as the first President & Chief Executive Officer and a member of the Board of Directors for the Delaware Innovation Space where Bill is on Ioan from his employment with DuPont. The Delaware Innovation Space is a new mission driven non-profit organization formed in partnership with DuPont, University of Delaware, and the State of Delaware to incubate and accelerate science based startups and is located on the renowned Experimental Station campus in Wilmington, Delaware.

Prior to joining the Delaware Innovation Space, Bill led DuPont's global operations for science and engineering and open innovation best practice process that included oversight for DuPont's innovation centers and regional laboratories around the world. Bill also has served in a variety of research, marketing, business development, joint venture, and manufacturing leadership roles in DuPont over the years. Bill is an active volunteer and has served on many technical and government advisory committees and presently serves on the Board of Directors for the American Association for the Advancement of Science (AAAS) and The Resolution Project.

### **Purnesh Seegopaul**

Pangaea Ventures

Dr. Purnesh Seegopaul is a General Partner at Pangaea Ventures, the leader in advanced materials venture capital. He previously held leadership positions in both large technology enterprises and materials startup companies.



Purnesh is now applying his entrepreneurial passion and expertise with world-class emerging companies utilizing advanced materials in energy, electronics, health and sustainability to make our world better. Purnesh received his B.Sc., with distinction, from the University of Guyana, Ph.D. in Chemistry from the University of New South Wales in Sydney, Australia where he was a Commonwealth Scholar and completed his post-doctoral fellowship at the University of Delaware.

#### Laura Silva

#### University of Arizona

Laura Silva has more than 30 years' experience in various roles including chemical process engineering, technology development, intellectual property strategy and commercialization, entrepreneurism, and senior executive management. She was recently appointed as the Senior Licensing Manager for the College of Science at the University of Arizona, where she works with researchers to identify, protect, and license technology. She previously served as Vice President, Legal and IP at Velocys, a company she co-founded to commercialize innovative chemical process technology for conversion of low value gas and waste to renewable fuels and chemicals. Her experience in intellectual property and licensing spans the lifecycle of innovation: from initial concept development and protection to mature commercial offering and patent enforcement; from company start-up to executive legal and IP management of a publicly-traded company. She has negotiated and completed alliance transactions with diverse companies worldwide, ranging from Fortune 50 to small private companies in various industries, including in energy, chemicals, consumer products, construction, and manufacturing. Prior to Velocys, she served as Commercialization Manager for Battelle Memorial Institute, and has also served in various technology development and engineering assignments at Chevron and Battelle.

#### Tony Stanco NCET2

Tony Stanco, Esq. is the founder and executive director of the National Council of Entrepreneurial Tech Transfer and co-founder of National Angels USA. Previously he was the director of the Council of Entrepreneurial Tech Transfer and Commercialization (CET2C) of The George Washington University. Mr. Stanco was a senior attorney at the Securities and Exchange Commission. He also has worked on innovation policy, including start-up creation and funding by angel investors and VCs. At School of Engineering and Applied Science at The George Washington University, Mr. Stanco worked with universities and governments around the world on innovation policy, startup finance policy, software policy, Open Source, cyber-security, and e-Government issues. Mr. Stanco has appeared before the US Congress, various US defense and civilian agencies, the World Bank, the European Commission, United Nations, Inter-American Development Bank, and Organization of American States. Mr. Stanco teaches the Lab to IPO course dealing with start-up formation and funding. He has an LL.M. from Georgetown University Law Center in securities regulation and is licensed as a lawyer in New York state.

#### **David Sudolsky**

Anellotech

David Sudolsky is the President and Chief Executive Officer of Anellotech, which is developing the Bio-TCat<sup>"</sup> process to produce cost-competitive renewable aromatic chemicals (benzene, toluene and xylenes, "BTX") from nonfood biomass for use in making plastics such as polyester, nylon, polycarbonate, polystyrene, or for renewable transportation fuels.

Anellotech is currently evaluating loblolly pine and eventually other sustainable bio-feedstocks at its sevenstory tall TCat-8° pilot plant. Anellotech complements its world-class R&D team with in-depth, long-term alliances with leaders to leverage decades of successful experience

in developing and commercializing process technology. IFPEN is Anellotech's process development and scaleup partner, Johnson Matthey is the company's catalyst development partner, and Axens is Anellotech's partner for commercialization, global licensing and technical support. Industry-leading strategic partners in the BTX supply chain, including Suntory and Toyota Tsusho, as well as other confidential strategic investors, have provided funding to Anellotech.

Prior to founding Anellotech, Sudolsky was a business officer or CEO of five biotechnology, specialty pharmaceutical and bioprocessing start-ups, one of which (Dura Pharmaceuticals) was sold for \$1.8 billion. Sudolsky has hands-on chemical engineering experience in process design and refinery plant startups with Union Carbide, and work at Booz, Allen & Hamilton. He is a firm believer in environmental education and co-led a successful five-year effort ending in 2011 to build a multi-faceted Eco Center on the roof of a public school in the middle of New York City. David attended Columbia University where he earned an MBA in Marketing and Finance from the University's Business School and a B.S. in Chemical Engineering.

### **Bryan Tracy**

White Dog Labs

Bryan Tracy, PhD, is the CEO and co-founder of White Dog Labs, Inc. (WDL) Previously he was CEO and co-founder of Elcriton, which was acquired in 2014. WDL is inventing and commercializing biochemical technologies to produce renewable chemicals and fuels through novel technologies that simultaneously consume carbohydrate and gaseous feedstocks in fermentation. WDL is particularly focused on bio-acetone, -isopropanol and –ethanol production. Bryan is an expert in genetic engineering of bacteria and fermentation process development with many peerreviewed academic publications. He is also a supplemental faculty member at the University of Delaware, a technology to market consultant for the ARPA-E, founding member of the ACS GCI Biochemical Technology Leadership Roundtable, and board chair of the Delaware Sustainable Chemistry Alliance. Bryan is also passionate about public service and youth development, whereby he serves as board chair of the Forum for the Advancement of Minorities in Engineering (FAME), is an inaugural mentor in the Delaware Youth Leadership Network and is a Leadership Delaware fellow. Bryan received a BS in Chemical and Biomolecular Engineering from North Carolina State University, during which time he worked for Novozymes N/A, and a PhD from Northwestern University.

### Xun Wang

Triton Algae Innovations

Dr. Wang, President and CEO, is the most experienced technology executive in the algae industry and most recently was head of bioscience technologies at Reliance Industries Ltd (a global Fortune 100 company), and CTO at Sapphire Energy Inc. Dr. Wang has been a board member of Algae Biomass Organization since 2016.

Prior to that Dr. Wang had an over 18-year successful career in leading agriculture companies. Dr. Wang was the President of Syngenta China, the Biotech Research and Technology Head of Syngenta in North Carolina RTP, the Founder and a Director of Novartis Agricultural Discovery Institute in San Diego, and Research Manager of Corn Genomics in Pioneer Hi-Bred International, in Johnston Iowa.

Dr. Wang is author or co-author of over 50 patents, published over 20 international peer-reviewed research articles. Dr. Wang earned a Ph.D. in Biochemistry & Biophysics from Iowa State University, and a BS in Chemistry and a MS in Biochemistry from Jilin University, China.



AIChE's volunteers are the core of the Institute and make all of its programs, conferences and educational efforts possible. These offerings provide excellent opportunities for AIChE members and meeting attendees to gain greater technical expertise, grow their networks, and enhance their careers. AIChE events provide engineers, scientists, and students a platform to present, discuss, publish and exhibit their discoveries and technical advances.

At all times, volunteers and meeting attendees should act in accordance with AIChE's Code of Ethics, upholding and advancing the integrity, honor and dignity of the chemical engineering profession. AIChE's Board of Directors have developed these guidelines to foster a positive environment of trust, respect, open communications, and ethical behavior. These guidelines apply to meetings, conferences, workshops, courses and other events organized by AIChE or any of its entities and also to volunteers who conduct other business and affairs on behalf of AIChE.

SPECIFICALLY:

- 1. Volunteers and meeting attendees should understand and support AIChE's Code of Ethics.
- 2. Volunteers and meeting attendees should contribute to a collegial, inclusive, positive and respectful environment for fellow volunteers and attendees, and other stakeholders, including AIChE staff.
- 3. Volunteers and meeting attendees should avoid making inappropriate statements or taking inappropriate action based on race, gender, age, religion, ethnicity, nationality, sexual orientation, gender expression, gender identity, marital status, political affiliation, presence of disabilities, or educational background. We should show consistent respect for colleagues, regardless of discipline, employment status, and organizations for which they work, whether industry, academia, or government.
- 4. Disruptive, harassing or other inappropriate statements or behavior toward other volunteers, members, and other stakeholders, including AIChE staff, is unacceptable.
- 5. Volunteers and meeting attendees should obey all applicable laws and regulations of the relevant governmental authorities while volunteering or attending meetings. Volunteers and meeting attendees taking part in any AIChE event should also comply with all applicable safety guidelines.

Any violations of the foregoing should be reported to the President or the Executive Director of the Institute.

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