

**2015 NorCal AIChE Symposium**  
**The Entrepreneurial Chemical Engineer**

**Tuesday, April 21, 2015**  
**8:30 am – 4:00 pm**

**Chemical Engineering Topics Supporting Entrepreneurial Efforts**

1. **8:35 am - Going beyond sugar as a carbon source: Development of novel biofuels and bioplastics from “waste” carbon sources including digester gas, flue gas and municipal wastes**  
**Bill Orts**

The USDA team is developing biorefinery strategies that are applicable in the Western U.S. by converting agriculturally-derived biomass feedstocks into value-added products. Recent economic models are used to question the value of converting cellulosic feedstocks into sugars compared to using less-valued “waste products” as carbon feedstocks for producing biofuels and bioproducts. As will be discussed, biogas, specifically methane and CO<sub>2</sub>, is readily converted to biofuels and degradable plastics more effectively than sugars, providing a better carbon footprint. This presentation will focus on strategies for developing integrated biorefineries with specific discussion on the production of (1) methane from anaerobic digestion (2) production of biopolymers, including poly(b-hydroxy alkanates), PHA, from biogas, and (3) production of other chemical intermediates derived via conversion of CO<sub>2</sub> and methane to commercially-viable fatty acids. Discussions will include production of value-added co-products, including “green” monomers for biodegradable polymers, and novel nanocomposites.

**Bill Orts**

William Orts is Research Leader at the USDA’s Western Regional Research Center, directing a team that provides biorefinery strategies relevant to the Western U.S. He has more than 30 years of experience in multi-disciplinary research related to bioproducts and biofuels at government, academic and industrial settings. Dr. Orts has had the good fortune to work with multiple companies, both big and small, that are forging new breakthroughs in biofuels and bioproducts. As a result of their success he’s been awarded several honors including the USDA’s Secretary Honor Award for Outstanding Technology Transfer.

2. **8:55 am – Liquid fuel production through oxidative coupling of natural gas**  
**Joel Cizeron**

Siluria Technologies has developed a commercial viable route from natural gas to olefins by unlocking the potential of one step conversion of methane to Ethylene. This talk discuss the integration of the Oxidative Coupling of Methane with Olefins oligomerization to produce liquid fuels from natural gas.

**Joel Cizeron**

Dr. Cizeron has degrees in Physical Chemistry and Material Sciences from Paris 6 university. He came to the US to work on nano-materials at Rice University as a post-doctoral associate. He then went to the industry in the heterogenous catalysis field at Delphi Automotive before moving to Catalytica Energy Systems and Symyx. He joined the Siluria team in 2010 as the

4<sup>th</sup> employee to develop the core OCM technology and set up high-throughput testing capabilities. He is now leading the OCM reactor scale up and reactor process engineering.

3. 9:15 am – Create possibilities. prepare yourself. achieve and succeed.  
Courtney Vella

As we navigate our personal and professional lives, we're faced with challenges, possibilities, and opportunities. We need to balance technical, business and personal options in order to create a passionate concoction that leads to future success. Presentation of edgy, inspirational, resourceful and entrepreneurial approaches with a focus on highly collaborative projects and activities that create a learning platform to enhance your career path.

Courtney Vella

Courtney Vella is a young professional in the biotechnology and pharmaceutical industry. Courtney holds a BS degree in Chemical Engineering and Business Minor from San Jose State University in San Jose, CA. With PrO Unlimited at Genentech, Courtney is currently an Associate Engineer in Global Engineering – Commissioning and Qualification, where she started in summer 2012 as an intern.

Networking Break – 9:35 am – 9:50 am

4. 9:50 am - Bioconversion of methane: An entrepreneurial approach to commercialization – Bryan Yeh

The low cost and abundant supply of natural gas has been the motivation for the development of many conversion technologies that convert this low cost carbon feedstock into a compound of greater value. Methane bioconversion is a technology that exploits a methanotroph, a methane eating bacteria, by applying synthetic biology to program it to produce materials of interest such as biofuels or terpenes. The production of isobutanol and farnesene from a methanotroph has been demonstrated, and an exclusive channel collaboration has been formed to bring this technology to the demonstration scale by 2017.

Bryan Yeh

Bryan Yeh is currently Vice President, Research & Technology for Intrexon, a leading synthetic biology company that applies engineering principles to biology to enable products in the health, energy, consumer and environmental industries. Prior to joining Intrexon, Bryan served as Chief Operations Officer for ZeaChem, one of the first companies to demonstrate commercial production of cellulosic ethanol, Assistant Vice President for Science Applications International Corporation (SAIC), where he managed the biofuels practice as served as Chief Scientist for DARPA's Algae to Jet fuel program, Assistant Vice President at General Electric, and numerous senior level positions at Cargill, where his responsibilities included the construction of Cargill's Blair, Nebraska Corn Milling facility. Bryan also serves on numerous volunteer boards including serving as President of the Parkmead Education Resources Council and an advisory board member for Kiverdi and Supercritical Solutions. Bryan has authored numerous peer reviewed papers in the area of distillation, biofuel production and gasification. He has a degree in Chemical Engineering from the University of Wisconsin, an MBA from the University of

Minnesota and was the 2011 recipient of the Professional Progress Award from the Norcal section of AIChE.

5. 10:20 am – Extreme performance of CVD diamond materials

Brooke Locklin

Advancements in Chemical Vapor Deposition (CVD) diamond synthesis have made it possible to achieve extreme thermal and optical properties within diamond materials. Additional advancements have allowed for great reductions in thermal barrier resistances at the interface of Gallium Nitride-on-Diamond, (GaN-on-Diamond), materials making them the highest thermal conductivity and power rated material known. With improved synthesis techniques thermal conductivities up to 2200 W/mK can be achieved and material exhibiting extreme optical and thermal properties

Brooke Locklin

Brooke is Semiconductor Product Applications Engineer for Element Six Technologies in Santa Clara, CA and has served in this role for 2 years. Since her arrival, Brooke Locklin has assisted in developing many new products used in the high power and semiconductor industries, as well as extreme ultra-violet transmission applications. Prior to joining Element Six Technologies, Brooke was employed as process development engineer with another CVD diamond company making advancements in thin film diamond and diamond seeding applications. Ms. Locklin's career has included chemical process development and a vast amount of external and government project management where she has gained an impressive role in Silicon Valley's thermal engineering network. Brooke graduated from San Jose State University with a BS in Chemical Engineering with an emphasis in Green Engineering, and a minor in Materials Engineering.

6. 10:40 am - Solving social and environmental issues through innovation and entrepreneurship

Daniella Russo

Dr. Gregory Baxter

We live in times of accelerated change and constant challenges to eco-systems – climate change, air-water pollution, water scarcity, food security, displaced people just to name a few. Addressing these major issues using the same environmental and social practices that have consistently failed us, is not working. But we can approach them as innovation challenges and economic opportunities, embrace the complexity and turn them into emerging industries producing jobs and advancing technological progress.

Daniella Russo

Daniella Dimitrova Russo believes in the power of innovation and entrepreneurship to address intractable and complex environmental challenges.

For many years, Daniella Russo has led the development of an innovation eco-system to reduce the impact of petroleum-based plastic on the environment and public health, with special focus on marine debris. The global strategy includes building consumer demand; accelerating

entrepreneurship, enabling investment, and creating transformative forward-thinking public policies, such as creating long-term economic incentives for developing and implementing innovation with focus on eliminating plastic pollution.

In 2007, she launched Think Beyond Plastic™, the award-winning 360 campaign associated with [National Geographic's Strange Days on Planet Earth](#). The campaign included a creative mix of traditional media, social media, advocacy and hands-on outreach and grew to 360,000 people, businesses and organizations working to reduce their plastic pollution footprint. In 2012, she launched the [Think Beyond Plastic™ Innovation Forum](#), a social impact venture that harnesses untapped innovation, entrepreneurial and investment opportunities. The Think Beyond Plastic™ innovation eco-system encompasses the entire process of innovation, from formulating and incubating ideas to commercializing technologies and accelerating businesses.

Think Beyond Plastic™ is a model for addressing global sustainability problems that can be extended to food security and agriculture, clean energy, climate change and other pressing issues.

Daniella Russo's business approach leverages her executive management experience with NGO and for-profit businesses. Her prior experience includes executive management of businesses from start-up phase through an IPO; general management within Fortune-500 companies; successful brand development, repositioning and management; building powerful online communities; mentoring and advancing entrepreneurs. Her executive background includes desktop publishing leader Frame Technology, internet pioneer Infoseek, Sun Microsystems, Xerox PARC and many others.

Daniella Russo co-founded and led Plastic Pollution Coalition, and grew it to become the world's largest NGO dedicated uniquely to ending plastic pollution. She serves on the Board of Advisors of BLUE Ocean Conservation Summit, EPR think tank UPSTREAM, as well as PulpWorks, Inc, NewGenSurgical and numerous other businesses.

Daniella Russo leads the strategy and vision for Think Beyond Plastic™. She is a frequent speaker on innovation and entrepreneurship, with focus on sustainability. She mentors accelerator companies on business strategy, business development, entrepreneurship, plastic pollution and sustainability.

#### Dr. Gregory Baxter

Dr. Baxter works at the intersection of innovation and biotechnology, and brings a wealth of expertise in biochemistry, nanotechnology and entrepreneurship.

He is a published author and holds over 20 patents on various aspects of molecular biology and biochemistry. He serves on the Board and is the Chair of the Science Advisory Board of Stellar BioTechnologies, the world leader in immune-stimulating proteins for therapeutic and diagnostic markets; and is a Board Advisor to CertiChem, Inc. the experts in detecting endocrine activity in consumer products.

Dr. Baxter is a long-time mentor and member of the Founders Board of Advisors at StartX Stanford Student Startup Accelerator and was a Fellow with the Innovation Accelerator, a public private partnership with NSF to facilitate the commercialization efforts of small businesses.

Dr. Baxter was the founder and CSO of Hurel Corporation, a biotechnology company. He was the Founder and CSO of Aegen Biosciences. He was a Program Director with the Division of Industrial Innovation and Partnerships at NSF. He is an Adjunct Associate Professor with the Department of Biomedical Engineering at Cornell University and was a Senior Scientist at the Cornell Nanoscale Science and Technology Facility and the Biotechnology Liaison for the National Nanofabrication Users Network.

As a Chief Technology Officer, Dr. Baxter leads the innovation outreach. He explores new technologies and materials, evaluates innovations and evaluates transformative materials and technologies that provide alternatives to conventional plastics. He evaluates and assesses the public health impacts of chemicals and materials utilized by companies represented by the various investment classes of the accelerator. He mentors accelerator companies on life sciences innovation and entrepreneurship; IP protection, Freedom to operate; Investor relations and best business practices.

#### **NorCal AIChE Awards 11:00 – 11:15 am**

Presentation of the Awards Committee

#### **Northern California Chemical Equipment Vendor Table Top Trade Show: 11:15 – 1:00 pm**

Lunch and networking in a table top display setting.

#### **The Entrepreneurial Chemical Engineer**

1. 1:00 pm - The Art of Being an Entrepreneur  
Monem Alyaser

Entrepreneurs have a different approach to business and life. Chaos is welcomed as long as opportunities can be kicked out of the mix and an organized defined clarity can lead to a profitable investment. Risk is not avoided, but is well understood. The simplicity and focus of delivering the initial entrepreneurial product is followed by well thought out plan for growth. Entrepreneurs are full of paradox. The drive and passion to launch the idea into the business may have to be replaced with letting go and giving the business to a new set of leaders to continue its path to growth and continued success. George Washington laid down the sword once he made sure that his start up was on a successful path. The focus on the metrics of investment must be balanced with the need to change direction on new information. Willingness to go all in and know that in any situation a solution will emerge continually battles with the need for insuring that bills are paid and commitments met. Captain Kirk's ability to give the order to save the day, must be preceded by Spock's logical evaluation of the options for consideration. Chemical system development must never compromise on safety. The

evaluation and understanding of the energy stored and potential energy released from various operations must be given the time and resources needed to insure that a hap hazard and corner cutting first prototype is not dangerous to all who are involved. Many of the traditional Information Technology based “get it out fast and fix it with patches as you go” methods may not apply to chemical entrepreneurial efforts. This consideration must not overwhelm the other traits that make the chemical development effort entrepreneurial. The spirit must be active and passionate, and it is even more important to have the highest performing people who know what they are doing.

### Monem Alyaser

Monem is an entrepreneur, materials process engineer, and expert in the design and optimization of high temperature reactors, furnaces and processes. He has over 20 years of experience in research in heat transfer and reacting flows. Before carbon emissions and the climate change issues became a front page issue, Dr. Alyaser co-founded Combustion & Process Technology in 1995 to solve the energy inefficiency, acid rain and emissions problems from industrial plants. His pioneering application of CFD in energy intensive industries and field engineering work led to the reduction of emissions from several plants by as much as 66% for pulp & paper, cement, metallurgical and mining companies such as Norske Canada, International Paper, Inco and Falconbridge. As the Director of Applied Thermal technologies, a leading thermal management consulting firm based in Silicon Valley, Monem provided engineering consulting services to leading high-tech companies such as Apple, Tesla, HP, Dell, Cisco, Huawei and Google. He also served as market and technology evaluation consultant to venture capital groups and international companies such as Hitachi. Monem’s held executive management position was with Asetek, where he participated in round B VC funded, as VP of Business Development. In addition to countless inventions in energy and thermo-mechanical integration of electronics products, Dr. Alyaser is the inventor of the Enventix integrated gasification and pyrolysis system. Monem earned a B.S. degree in metallurgical engineering from Laurentian University, Masters and Ph.D. in Metals & Materials Engineering from the University of British Columbia, and attended Stanford School of Business Executive Management Program

## 2. 1:30 pm – Entrepreneurial Perspectives

### Howie Rosen

### Ricardo Levy

To be an entrepreneur is not easy. The vast majority fail. It requires discipline, passion, and the right confluence of events. It requires a careful and systematic analysis of the opportunities and a focused development of a plan. It depends on clear awareness of the technology need, benefits, and competitive landscape. It requires relentless but flexible execution and, most importantly, financing. Yet these very challenges make entrepreneurship one of the most exciting career paths. It tests an individual’s capacity to deal with uncertainty, to attract and lead others, and to persist against any hurdles. We will review the main requirements to identify opportunities and develop sound business plans, and the personal characteristics that make for a good entrepreneur and a good leader.

### Howie Rosen

Howie Rosen is an independent consultant and serves on the board of directors of: AcelRx Pharmaceuticals, Inc. (NASDAQ: ACRX) where he has been interim CEO since April 1, 2015; ALCOBRA, LTD (NASDAQ: ADHD), where he has served as Chairman since 2014; ALDEA Pharmaceuticals, Inc.; Entrega, Inc.; Kala Pharmaceuticals, Inc., where he has served as Chairman since 2014; and, PaxVax, Inc., where he has served as Chairman since 2011. From 2004 to 2008, he was Vice President, Commercial Strategy at Gilead Sciences, Inc. where his responsibilities included strategic marketing, global brand management, health economics, competitive intelligence, market research and Gilead's overall portfolio and business planning. Prior to joining Gilead, Mr. Rosen was President of ALZA Corporation where he was responsible for all aspects of managing ALZA as an independent 1000-person operating company within the Johnson & Johnson Family of Companies. Previously at ALZA as Vice President, Product Development, he was responsible for product development activities, portfolio management and corporate and new product planning. Over his 10 years at ALZA, Mr. Rosen also had responsibilities for mergers and acquisitions, R&D planning, and technology ventures. Prior to joining ALZA, Mr. Rosen managed the west coast practice of Integral, Inc., was Director, Corporate Development at GenPharm International, Inc. and was a consultant in the San Francisco office of McKinsey & Co. Mr. Rosen was a member of the Stanford University Advisory Council on Interdisciplinary Biosciences from 2003 to 2011 and the Stanford School of Engineering Advisory Council from 2004 to 2007. Mr. Rosen is a member of the Biomedical Engineering Advisory Board at City College of New York. Previously he was a member of the BODs of CNS Therapeutics, Inc., CoTherix, Inc., NTF Therapeutics, Inc., Pearl Therapeutics, Inc., where he served as interim President and CEO from June 2010 to March 2011, and Pharsight Corporation. Mr. Rosen is a Lecturer in the Department of Chemical Engineering at Stanford and a Lecturer in Management at the Stanford Graduate School of Business. He is also a member of the National Academy of Engineering (NAE), where he is Chair of the Bioengineering Section, and a Fellow of the American Institute for Medical and Biological Engineering (AIMBE). He is co-inventor on 7 US patents. Mr. Rosen received an MBA from the Stanford Graduate School of Business, where he graduated first in his class as the Henry Ford II Scholar. Mr. Rosen has an MS in Chemical Engineering from MIT and he graduated with distinction from Stanford University with a BS in Chemical Engineering.

### Ricardo Levy

Ricardo B. Levy is an entrepreneur whose career spans three decades of founding and building successful businesses. Born and raised in South America, he completed engineering studies at Princeton and Stanford with a PhD in catalytic chemistry. In 1974, after a number of years with Exxon, he co-founded Catalytica, a research and development firm. The company's discoveries resulted in over one hundred patents and led to the formation of three companies, one of which under his leadership became the largest supplier to the pharmaceutical industry in North America. Currently he serves on the Board of a public biotech company, StemCells Inc., is Chairman of the Board of a private analytics software company, NovoDynamics, Inc., and serves on the Advisory Board of the Santa Clara University Center for Science, Technology and Society, the leading global incubator of social entrepreneurs. He is a Lecturer at the Stanford University Chemical Engineering Department and is the author of the book "*Letters to a Young Entrepreneur*," published in 2010.

3. 2:00 pm - Legal matters: intellectual property, contracts, POs, agreements, and licensing  
Monica Winghart

Having a great idea that can evolve into a business is a fragile thing until there is a critical mass in cash flow to sustain the business growth. Capturing the idea requires trial error and documentation. The recent changes to the USPTO procedures makes the need for documenting and filing protection for the many ideas that become the kernel for a business even more imperative. The ability to defend claims, to insure that the idea is both unique and novel is guided by a set of legal work flows that allows the creation of a patent. Patents teach everyone what you are doing and gives you the license to protect what you are doing for a limited period of time. Alternative to a patent, is the protection of a trade secret which as long as it remains protected, is a competitive advantage that may be the critical element to insuring that business is able to grow without having competition knock the wind out of the sails of the new business too quickly. All successful business relationships are built on trust. Years of work to develop the subtleties of the relationship then are codified in clear and effective contracts. Every transaction and supplier relationship is a contract. The same base principles are woven into the variety of contracts that are required to establish and operate a business. All transactions are contracts. Good fences make good neighbors, and good contracts make good business.

#### Monica Winghart

Monica is Of Counsel with ROL Group where she provides strategic consulting services to a variety of high tech, CPG and biotech companies on IP matters, licensing, IP monetization, partnership and joint development arrangements, data protection and privacy. She specializes in policy and process design for intellectual property concerns and has particular expertise in supporting organizations in cross-border matters to Europe and Asia. Monica is also the Chief Legal Advisor for Globiana, LLC, a startup company that increases the success rate of corporate relocations by focusing on the needs of the trailing spouse and family. Monica leads Globiana's legal efforts to connect the world's largest companies with expat support services.

Previously, Monica was the General Counsel of Article One Partners, a global crowdsourcing company specializing in the discovery and use of prior art in strategic patent litigation, licensing and prosecution matters. Monica also worked with The Clorox Company where she was Director of IP litigation, functioned as lead counsel for the three of the company's largest business units and served on the M&A and transactions teams. Earlier in her legal career, Monica was an IP attorney with several firms in Los Angeles and Atlanta. Before attending law school, Monica worked as an engineer with Procter & Gamble and was the principle in an engineering consulting firm.

Monica is recognized as one of the world's leading IP strategists in the IAM Strategy 300 2014 and she serves as an advisor on IP, social media, privacy and data protection matters for several government organizations. She is the immediate past-Chair of the IP Committee for the Association of Corporate Counsel and a member of various Silicon Valley/San Francisco Bay area and national professional and philanthropic organizations, including currently serving as a board member for the East Bay SPCA.

Monica is a member of the California and Georgia Bars and is a USPTO registered patent attorney. She holds a JD from Tulane Law School and a BS in Chemical Engineering and a BS in Pulp and



Paper Technology from North Carolina State University. Monica lives in the Bay area with her three children and a menagerie of pets.

Networking Break: 2:30 – 2:55 pm

Snacks, coffee, tea and water sponsored by the event in a centralized area to allow discussion and connection on the topics of the day.

4. 3:00 pm - Developing the data sets, getting the work done: bench, pilot, full scale, EOs, KLRs, and measurement metrics

Christina Borgese

The critical element to the technical piece of the investment is the data that supports the claims. Can the product be demonstrated to be reproducible on the systems that are proposed? The capital investment for chemical projects are large and models must be validated against actual data from bench and pilot systems. Experimental Orders (EOs) and Key Learning Reports (KLRs) are a simple and organized way to define the runs that are required to produce the data that supports the claims being made for the investment. Capital and Operating Costs must be justified to the financial investors to deliver the returns expected.

Christina Borgese

Christina Borgese is Director of Engineering and Development at PreProcess, Inc., a process development, engineering, and program leadership firm that delivers customized technical solutions to entrepreneurs. Focused on first of their kind chemical processes, Christina and her team scale systems from bench, to pilot, to plant and lead the commercialization process for chemical engineering mega projects with values from 300 million to beyond one billion dollars.

In 2013 Christina was recognized for excellence by the Society of Manufacturing Engineering and in 2010 her team received a World Economic Forum Technology Pioneer award in Davos, Switzerland.

Christina has had an active role in AIChE in many varieties and currently brings her first hand entrepreneurial experience to her role as Director in the AIChE Management Division. For the past ten years Christina has volunteered with student AIChE chapters where she guest lectures and coaches young engineers in their professional development. In an effort to transition young engineers from academic achievement to practical applications PreProcess created Engineering Bootcamp, a three-day course providing employees new to process engineering with a hands-on, industry focused understanding of the essential building blocks for process and manufacturing engineering.

Christina was also a standout at the University of California, Santa Barbara, where she earned a bachelor's degree in chemical engineering and technology management and was honored with the University Award of Distinction.

5. 3:30 pm - Another perspective on an entrepreneurial approach

Ron Elsdon

One form of entrepreneurial activity for a chemical engineer is to be part of a start-up that makes product and requires significant capital investment, for example in the form of venture capital. In this approach the primary objective is likely financial and may be defined by others such as the initial investors. Another form of entrepreneurial activity is based on intellectual capital brought by an individual, possibly in partnership with others, with value created from the application of know-how. This approach is not based on making product and it does not require substantial capital investment. The purpose is not just to make money rather it is to bring personal fulfillment including financial reward, and community benefit. This approach could include, for example, consulting, teaching, writing, or data analysis. It is supported well by today's technology and communication tools. Taking such a nontraditional and entrepreneurial path can be prompted by changing internal perspectives at various life stages, or by disruptive external events. In this session we will explore why, when, and how creating such a nontraditional path can be inspiring and appealing.

### Ron Elsdon

Ron Elsdon is a founder of organizations in the career and workforce development fields and has more than 25 years of leadership experience in various sectors including the chemical industry. His published works include *How to Build a Nontraditional Career Path: Embracing Economic Disruption* (Praeger, 2014), editor of *Business Behaving Well: Social Responsibility, from Learning to Doing* (Potomac Books, Inc., 2013), editor of *Building Workforce Strength: Creating Value through Workforce and Career Development* (Praeger, 2010), and author of *Affiliation in the Workplace: Value Creation in the New Organization* (Praeger, 2003). He holds a doctorate in chemical engineering from Cambridge University, a master's in career development from John F Kennedy University, and lives in Danville, California.