

# LAUNCH CHEMISTRY INNOVATION CHALLENGE 2016

## Smarter Chemistry for a Greener Future

### BACKGROUND

LAUNCH is a network-centered innovation platform founded in 2009 by NASA, NIKE, Inc., the U.S. Agency for International Development (USAID) and the U.S. Department of State to identify and foster breakthrough ideas for a more sustainable world. LAUNCH aims to move beyond incremental change and make an impact at a systemic level.

In May, 2016, LAUNCH gathered 30 subject matter experts from industry, academia and NGOs for a full-day Big Think - a multidisciplinary forum to discuss the barriers and opportunities to positively transforming the system of chemistry. Seven key areas of need were identified: Business Models, Data, Design, Education, Testing, Transparency, and Manufacturing.

LAUNCH Chemistry is releasing a series of global innovation challenges to address these areas, thereby building an ecosystem of solvers to advance the wider system of chemistry. Inspired by and in service of the U.S. Materials Genome Initiative (MGI)\*, LAUNCH Chemistry is working to break down barriers to innovation, catalyzing a richer data ecosystem to accelerate a new model for chemical production and use. Specifically, LAUNCH Chemistry supports the following goals of MGI:

- Leading a culture shift in materials-science research to encourage and facilitate an integrated team approach
- Integrating experiment, computation, and theory and equipping the materials community with advanced tools and techniques
- Making digital data accessible

### CHALLENGE STATEMENT

***ENABLING SMART CHEMISTRY: How can advances in data generation, access, integration, analysis and application accelerate a shift towards more sustainable chemistries?***

The 2016 LAUNCH Chemistry Innovation Challenge is a global call for innovators, entrepreneurs, companies and organizations to enable predictive chemical design through innovative applications of data in chemistry. Imagine the potential of being able to design high-performing, greener chemicals and chemistries as easily as we can develop new software today. What if we were able to accurately predict function from a chemical structure, to have a complete understanding of the life-cycle of that molecule from the moment it was conceptualized and synthesized?

\*<https://www.whitehouse.gov/mgi>

The Chemistry Innovation Challenge is a partnership between the American Chemistry Society, NIKE, Inc., USAID and additional organizations. We believe that the future of chemistry is smart, data-rich and data-driven. **Smart Chemistry** will serve as a launch pad for a new generation of invention, allowing innovators to more effectively hack our physical world. By reaching this future sooner, we can accelerate progress on eliminating toxicity and creating materials that have yet to be imagined.

## FOCUS AREAS

We seek to identify and support the scaling of high impact solutions developed by innovators, entrepreneurs and businesses that advance smart, data-driven chemistry. Specifically, we are looking for solutions and methodologies in which data can support a new model of chemical production and use, replacing current methods with predictive algorithms and accelerating a field-wide shift towards predictive design.

This challenge is focused on four innovation areas: data generation, data access, data integration, and data application.

### **DATA GENERATION**

- **Generate data that changes the game for chemistry.** How can we bring together data high-throughput research, automation, and ubiquitous sensor technology to create information that improves our ability to develop and use sustainable chemistries?

**EXAMPLE** - Methods of increasing the information on the entire library of available chemicals.

### **DATA ACCESS**

- **Crack open the data silos.** Show us platforms and technologies that enable novel approaches to intellectual property and information sharing.

**EXAMPLE** - Organization of existing data, to include databases of chemicals and chemical formulations organized by function, certification levels, and licenses or precompetitive collaboration on industry pipeline challenges.

### **DATA INTEGRATION**

- **Bring together data sets to build complete solutions.** The world is full of local data sets. How can we aggregate this information and leverage the big-data generated? Where can one set of insights inform another?

**EXAMPLE 1** - Integration of datasets across industries or the translation of individual molecular properties or hazards into an accurate understanding of mixture properties.



**EXAMPLE 2** - Products, which enable automatic estimation of synthesis and lifetime costs of a new chemical or process, to include scale-up.

## **DATA ANALYSIS AND APPLICATION**

- **Convert data to actionable information to accelerate sustainable chemistry design.** How do we leverage predictive analytics to drive better decision-making during ideation, and ultimately produce greener solutions to the world's toughest chemical problems?

**EXAMPLE 1** - Predictive identification of hazard from structure.

**EXAMPLE 2** - Methods that leverage the myriad of reaction data to design and develop new reactions.

**EXAMPLE 3** - Methods that predict and enhance chemical synthesis, for greener chemistry and more efficient production.

## **ELIGIBILITY**

In 2016, LAUNCH Chemistry is seeking data-oriented prototypes, proven technologies, solutions and businesses with the potential to scale and disrupt the chemistry status quo. Innovations may include, but are not limited to: algorithms, APIs, innovative business models, technologies, processes, programs, products, and software applications that make chemistry smarter. Analytical methodologies and technologies may include a variety of computational approaches and data science, including artificial intelligence, cheminformatics, crowdsourcing applications, data analytics, data visualizations, machine learning, and universal data formats. Applications of technologies and methodologies from different fields that could be applied to this challenge are welcome.

All aspects of chemistry data are in play - hazard prediction, toxicology data for molecules, mixtures, and materials, data related to supply chains, synthetic design, reaction analytics, and predictive design are all important aspects of this problem.

The challenge is open for anyone to apply. Responses from academics, companies (small or large), entrepreneurs, inventors, non-profit organizations and research institutions, national laboratories, government agencies, social enterprises and venture capital are welcome. Cross-disciplinary teams are highly encouraged to apply. Solutions may be at the stage of functional prototype up to market-ready solutions. Applicants ready to be supported by industry partners or ready to be scaled up will receive the most benefit from the LAUNCH experience.

## AWARDS

Teams selected as LAUNCH innovators will become part of the LAUNCH Network, not only for the duration of the current challenge cycle, but beyond. When a team joins LAUNCH, they become an active participant in a growing network of some of the most disruptive thinkers. They will receive visibility for their own work, exposure to new ways of thinking and access to key experts and stakeholders across the materials and manufacturing system that can accelerate the trajectory of their innovations into the marketplace. Through their participation, they will expand the network's capacity to transform the system of chemistry and build a more sustainable world.

Specifically, innovators will receive:

- All expense paid travel to attend the LAUNCH Forum in January 2017, where we will facilitate targeted conversations with a curated selection of the LAUNCH Network of chemistry experts, business and governmental leaders, industry partners and investors. The multi-day Forum will include access to chemistry industry experts, business and governmental leaders and investors.
- Ongoing Acceleration support to leverage the LAUNCH Network to refine and scale your innovations, secure commitments and establish new connections, all driven towards enabling high value transactions within the system to unlock opportunities to further your success.
- Assistance with articulating a compelling narrative and growth strategy to create a concise, high-impact presentation, which will be streamed live during the forum and recorded for future use.
- Public recognition from the LAUNCH platform and partner organizations.
- Media and public relations training and exposure, including a professional video of your innovation stories, which will be featured on LAUNCH.org.
- Continued engagement with, and access to, the LAUNCH Network beyond the challenge cycle.

No cash prize will be awarded.

## EVALUATION CRITERIA

High profile individuals and experts from the LAUNCH Chemistry community will select the top 5 to 8 innovative applications, ensuring that the innovations selected are supported by key industry partner and giving all applicants exposure to a world class network of industry pioneers, government organizations, investors, and innovation experts. The evaluation criteria will be as follows:

1. **Practicality of use, impact and potential for scale (20%)** - The innovation (i.e. chemistry data solution or functional prototype) should meet its identified market and customer needs. The applicant should demonstrate the potential of the solution or functional prototype to enable chemistry to function-based design in chemistry.

2. **Technical feasibility (20%)** - The innovation is technically viable, includes information on how it would be implemented and has a working prototype to further show its functionality and usability.
3. **Relevance to the challenge focus areas (20%)** - The applicant shows that he/she understands the specific context of the challenge statement to which they are applying and has aligned the innovation with one or more of the 2016 LAUNCH Chemistry Innovation Challenge focus areas.
4. **Innovativeness (20%)** - Creativity and originality of the idea compared to solutions that are currently in use.
5. **Team (20%)** - The applicant has applicable technical background and has the management capability to take this solution to the implementation phase.

## TIMELINE

### **Phase 1**

Application Period

**Timeframe:** August 9th – October 31<sup>s</sup>

### **Phase 2**

Application Review

**Timeframe:** October 31<sup>st</sup> – November 7<sup>th</sup>

Advisory Council Vote

**Timeframe:** November 8<sup>th</sup> – December 4<sup>th</sup>

Interviews with Top 20 Applicants

**Timeframe:** November 8<sup>th</sup> – December 4<sup>th</sup>

Portfolio Selection

**Timeframe:** December 5<sup>th</sup> – 14<sup>th</sup>

### **Phase 3**

Announcement of Winners (5 to 8 innovators)

**Timeframe:** December 15<sup>th</sup>

LAUNCH Forum

**Timeframe:** January 25<sup>th</sup> – 26<sup>th</sup>

## SUBMIT YOUR INNOVATION

LAUNCH has sourced and supported life-changing, sustainable solutions in water, health, energy, materials, and waste. To date, hundreds of innovators have stepped up to these challenges and



more than 80 of them received more than \$95 Million from external funders. The 2016 LAUNCH Chemistry Innovation Challenge has the potential to revolutionize the way we make, build, and live - join us.

If you are working on an innovation that will contribute to the data-driven, data-rich future of chemistry, we want to hear from you. While the focus is on data generation, data access, data integration, and data analysis, applications from all fields and technologies are welcome.

The 2016 LAUNCH Chemistry Challenge closes October 31st 2016. Go to [launch.org/challenges/chemistry](http://launch.org/challenges/chemistry) to submit your application.

For any questions, please contact [challenge@launch.org](mailto:challenge@launch.org)

