



The Thiel Foundation's Breakout Labs program funds innovation

www.breakoutlabs.org

Piper J. Klemm

"Any strategy that involves crossing a valley—accepting short-term losses to reach a higher hill in the distance—will soon be brought to a halt by the demands of a system that celebrates short-term gains and tolerates stagnation, but condemns anything else as failure. In short, a world where big stuff can never get done."

—Author Neal Stephenson, "Innovation Starvation," *World Policy Journal*, Fall 2011

One of the greatest challenges facing the sciences, and materials science in particular, is the difficulty in developing truly new concepts in research environments where there is a demand for immediate and applications-ready results. Surpassing this myopic funding climate requires not just foresight, but also a willingness to take risks to "cross the valley" to the next great discovery.

In gaining the momentum to reach that next "hill," the aid of private outside funding agencies has become critical to the work in materials research. San Francisco's Thiel Foundation has recently inaugurated their Breakout Labs program with the goal of funding innovative research of independent scientists who are not necessarily entrenched in the structure of either academic or corporate development, or scientists who are waiting to "break out" of academia with their start-up idea.

Hemai Parthasarathy, the science director for Breakout Labs, sat down with me to talk about the importance of the program, as well as her own perspectives on the world of scientific funding, publication, and literacy. From her start with a PhD degree in systems neuroscience from the Massachusetts Institute of Technology to her time as both a post-doctoral fellow and a founding editor of the Public Library of Science (PLoS), Parthasarathy has had a chance to experience science from both the laboratory

bench and the evaluation side of science.

Her 10 years at PLoS convinced her of the importance of open access to scientific information to facilitate the advancement of science: Researchers who can communicate and ask each other for help are dramatically more productive and successful than researchers in isolation.

The Breakout Labs program is unique in that it funds for-profit start-up ideas in the open marketplace. Founder Peter Thiel, a co-founder and former CEO of Paypal and an early investor in Facebook, believes that the pace of technology has slowed down and society no longer aspires to scientific projects and inventions that are grand enough. According to the Thiel Foundation, now is a critical time for innovation, but early companies have few options for funding sources, especially the most high-risk companies that truly have the capacity to change the world.

Ultimately, Parthasarathy sees her work with Breakout Labs as the natural extension of her work at PLoS; she now has the chance to make a direct impact on the advancement of science before the work even starts. Her excitement in helping young researchers get the funding they need to change the world is palpable. At her core, she is focused on finding the best way that this young program can help to advance science.

The first months and years are a difficult time for start-ups with a novel

idea. They rely on personal contributions and angel investors to weather the initial period. Significant innovation is stifled by not having the multimillion-dollar framework of incubator spaces, angel investors, crowd funding, or the financial support of family and friends. Many companies cannot be successful in the Small Business Innovation Research (SBIR) or Small Business Technology Transfer (STTR) government granting cycles because they do not have the funding to generate the preliminary results that the funding agencies require.

This is where Breakout Labs comes in. Breakout Labs provides financing for the earliest stages of development in all areas of science and technology. Awards can be presented to researchers internationally. The result is a revolving fund that spurs innovation by ensuring that more scientists with a great idea can make it past that idea's infancy. Breakout Labs offers funding of applications of \$50,000 to \$350,000 in all areas of advanced technologies. It has rolling deadlines and decisions, meaning research can be funded as soon as it is ready without the wait for annual deadlines. Applications are peer-reviewed under nondisclosure agreements. The first six awards of \$200,000 to \$350,000 were announced on April 17, 2012, of over 200 applicants. Breakout Labs anticipates funding a total of 15–20 awards this year.

The six companies chosen for the initial round of funding are mostly at the intersection of biology and technology. Peter Thiel's personal quest for immortality was noted in this funding cycle, as three of the companies chosen strive to extend longevity. Funding was awarded to the following companies:

- **Inspirotec** (www.inspirotec.com), a company working to develop a low-cost and portable device that identifies air pollutants. It is their goal that "everyone will one day easily know what is in the air we breathe." With increasing press and focus on nanoparticles and other materials waste in the environment, a product such as this could become a staple in improving the safety of every materials research laboratory.



Recipients of the first round of funding from the Thiel Foundation's Breakout Labs.

- **Longevity Biotech**, a company that uses artificial protein technology to develop therapeutics. Using hybridtides, targeted artificial proteins, therapeutics can be developed and embedded for oral biological delivery.
- **3Scan** (www.3scan.com), a company that uses knife-edge scanning microscopes (KSEMs) to map connections in the human brain. KSEM “not only preserves images registration throughout the depth of the specimen block but also isolates the tissue above the knife from that below to eliminate back-scattering of light and bleaching of fluorescent-stained tissue below the light.” This technology is a tool that has the potential to advance materials research in drug discovery, connectomics, and medical devices.
- **Airgos Biomedical**, a company working on technology to cool and store organs so that they can be stored between donation and transplantation. Advances in cryopreservation mean organ banks could be ready for transplants as necessary.
- **Immusoft**, a company working to modify immune cells to produce therapeutics *in vivo*. The hope is that modified immune cells would be therapeutic agents for autoimmune disorders, including HIV, neurodegenerative disorders, infectious diseases, and enzyme replacement.
- **Positron Dynamics**, a company de-

veloping improvements to producing positrons for medical imaging and a source of antimatter propulsion energy for space travel.

The initial companies funded have the potential to provide materials science with innovation in sub-fields; Breakout Labs welcomes proposals from all sectors of materials science from the physical sciences (e.g., Positron Dynamics) to biology. The Thiel Foundation is searching for cutting-edge research—as Parthasarathy put it, “The only proof they need is that ‘you can’t prove this won’t work!’”

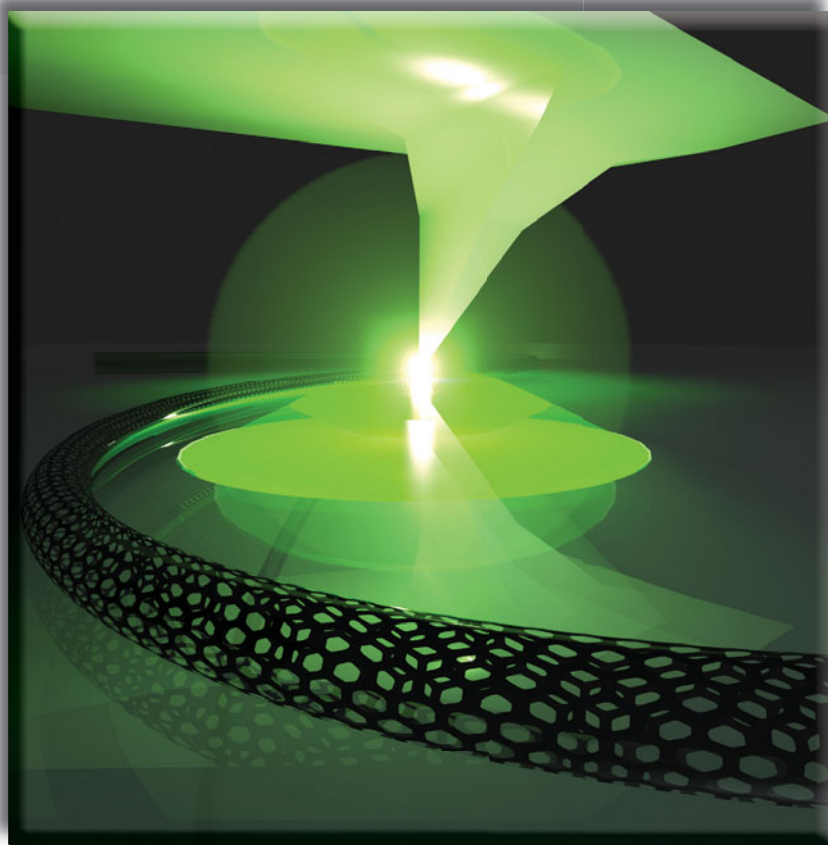
Ultimately, Breakout Labs aims to be a high-risk, high-reward fund. If the project is successful, a portion of the resulting royalties goes back into the Breakout Labs revolving fund (1% in the United States, but subject to regulations internationally). Because of the need for revolving funding and access to future royalties to fund future innovations, they do not fund projects in the university or academic setting. Outside of a large institution, the chance to do science in a way that is nimble, creative, and entrepreneurial is enhanced, but ultimately, there has to be funding to mitigate the loss of that infrastructure.

In the private sector, the Thiel Foundation realized, their money would make the difference in supporting a creative approach to new science. Parthasarathy said they are searching for a sweet spot where their dollars can make the most significant difference.

Perhaps what makes Breakout Labs most exciting is its approach to attracting the best and brightest. Applicants have been from all over the spectrum, from students leaving doctoral programs to very senior established professors as part of teams to commercialize their product. As alternative career paths have become more acceptable and encouraged in the sciences, and as there is an increase in the number of younger researchers who are interested in a non-traditional route, Thiel Foundation funding can be very attractive. The terms of Breakout Labs funding are generous and designed to be attractive to follow-on funding. Parthasarathy believes that Breakout Labs will act as a stepping-stone and “seal of approval” for future SBIR or investor funding.

Parthasarathy said this accessibility is critical, in part, because, “the academic pyramid can’t support all of the young proto-faculty that it is training.” There are students out there with an excitement about science but they do not see themselves following a purely academic path. Breakout Labs can help them get their idea off the ground and poised for future funding opportunities.

With the average time from discovery to application running typically 10 to 20 years, the Thiel Foundation is offering a new way of working that can speed up and liberate innovation and help the next generation of researchers to get through the valley to that next, higher hill. □



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¹ Deckert-Gaudig, T., Kämmer, E. and Deckert, V. (2012), J. Biophoton., 5: 215–219. doi: 10.1002/jbio.201100142

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