

CASE STUDY



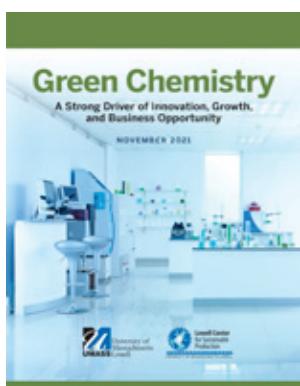
Checkerspot and WNDR Alpine

Scott Franklin had a long career in plant molecular biology, working in the industrial biotechnology sector for 30 years. He and his co-worker, Genet Garamendi, had both observed the tremendous potential that existed in the platform for developing new biotechnology-based materials. Franklin emphasized that, to be successful, it wasn't enough to simply produce biobased molecules—that a key part of the business is to animate them through a brand. As Franklin notes, “you need to have a focusing mechanism, otherwise you will be scattered in what you are trying to address with the biomolecular platform.”

Franklin's company, Checkerspot, approached a noted backwoods mountaineer by the name of Matt Starbenz, to lead a project in winter sports for their advanced biomaterials. The new brand, WNDR Alpine, focused on incorporating biomolecules in high performance backwoods skis. Starbenz notes:

“When I was called upon by Checkerspot, Inc. to lead a project in winter sports for their advanced biomaterials, I knew how much I didn’t know. Over the last year, I’ve learned, grown, led, and helped educate others on the importance of alternative perspectives when it comes to the creation of materials that are vital to our sport, community, and impact on our environment. Granted, skis are not textiles; but they are similarly complex compositions of a variety of synthetic and natural materials. Since the introduction of biobased resins, ski building simply hasn’t kept pace with

other outdoor categories and adjacent industries. True innovation requires a complete shift of focus while taking a bold step into uncharted terrain. This approach is how we landed on our new Algaltech™ ski materials platform, which has now brought about the Algal Core and the all-new cast PU sidewall application we refer to as Algal Wall.”



Excerpted from ***Green Chemistry: A Strong Driver of Innovation, Growth, and Business Opportunity***,
University of Massachusetts Lowell, November 2021

<https://greenchemistryandcommerce.com/publications>

QUICK FACTS

- Checkerspot, Inc. was founded in 2016
- High performance materials company that designs materials at a molecular level
- Designated a Public Benefits Company
- Based in Berkeley, California

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This development is a critical lesson for innovators in the green chemicals space and a key lesson is that you need to focus on the “so what” of the technology. In the early days of industrial biotech many people were creating a molecule and hoping they would know what to do with it. Franklin notes that “The big ah-ha moment for us was when we realized we needed to focus on what is possible with the new molecules using a three pillared approach: 1) the right chemistry 2) the material science, and 3) the actual fabrication of the product. This approach allowed us to create a virtuous learning cycle and animated what is possible in green chemistry. It is more than simply replacing ABS plastic with a new material that is not petroleum based, but to create a momentum by sharing this approach with others.”

There are three major components to the Checkerspot chemistry that produced the WNDR Alpine products:

1. The molecular foundry, which is the starting raw material. This is a triglyceride oil, produced from a single cell developed through permutation and purified just like a vegetable oil. The foundry tailors the oil output and changes the raw material that feeds into new materials.
2. The polymer chemical science, which takes the raw materials from the foundry and performs chemical conversion into the chemistry of new materials, which are then tested to assess changes in physical properties in a new polymer.
3. The SLC or fabrication involves animating and deploying the new material in an application that has an end consumer use (the skis).

Checkerspot took some time to get started in this direction. Franklin notes that “as a start-up we had a lot of inertia. You can go shop your molecule to manufacturers, and the first issue you encounter is your price. They always want something cheaper. There is a huge amount of infrastructure capital dedicated to making monomers, so if you come up with an alternative—they are not going to displace that infrastructure. That means that I have to run my polyethylene plant more efficiently to compete with that kind of investment. So, we learned right away we had to take a different route, which involved going to a brand and “animating” the technology in such a way that we could connect directly with consumers. Once we connected, this allowed us to go to adjacent industries and show them directly what we can do with the platform. We could make skis with materials produced from algae!”

Industrial biotechnology includes a lot of large players invested in permutation assets and who are focused on utilization of those assets. Many of these players also control feedstocks and want to develop molecules that utilize those feedstocks and assets. Many partners understand industrial biotech and are looking to develop materials that source sugar for these new biomolecules and partner with those companies who want to utilize their assets and help them operate more efficiently. This is equivalent to working with the petrochemical industry, but with the sustainable component of the industry.

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Franklin notes that “One of our biggest partners is DIC, a Japanese company that started out very narrow on a triglyceride derived monomer and then blossomed into a lot of additional derivatives based on that initial monomer. In order for us to address cost, we need partners who can work on permutation assets to minimize cost. Cordeon is another partner with assets in Brazil with sugarcane mills, that are very efficient and produce at a large scale for the types of permutations we do. The materials we focus on are high density foam used in skis and a cast used in components in the ski build. Both of those are the Alpine brand for a 2021 ski manufacturing process that involved a lot of tech transfer for foam development and cast for additional part applications in a ski. The challenge when animating molecules through a brand is that you take on a lot of the manufacturing aspects for the polymer; that is part of the challenge, but also the reward. You will never appreciate the challenges larger companies will have when working with your material, unless you see first-hand the limitations of your material. We also have partnerships with Beyond Surface Technologies and Patagonia/Gore which involve the same starting raw material but involves doing some additional chemical modifications and a lot of polymer chemistry for these textile finishes.”

“One of the exciting things about working with a brand like WNDR Alpine is that the ski and outdoor sports industry have their own social networks, and credibility is huge.¹ One of the key elements that we brought was recruiting the general manager of WNDR Alpine, Matt Starbenz. They have done a lot on their website and marketing videos to discuss the sustainability of the product to the end user community. WNDR is an outdoor brand, and every one of the products—the snow board, the jacket, the cap—are touch points to animate our technology. These are all consumers who care about the environment and the materials in products really matter. Performance is also critical, as you can’t have failure of the materials when you are in the back-country! The general managers have thus become our brand ambassadors, as they are world class skiers promoting our brand and we get a lot of inbound queries, which in turn has led to other application developments for other brands like K2, Salomon, and Burton’s. All of this validates our thesis—if you animate the technology through a brand, and build value through a brand, other will take notice of what you are doing.”

“One of the biggest problems we encountered initially is that the price of the raw material was often the end of the conversation when we approached large companies. Our monomer is \$6, and the industry’s is \$3. However, by animating through the brand we are able to earn our margin for the product—and are making money on every pair of skis sold. Animating the technology leads eventually to scale, and the cost of the raw material eventually comes down. There are concentric rings of scale that allow us to progressively move out into other industries that demand lower prices, and we anticipate eventually talking to Ford, GM, and automotive companies as we prove the value of the molecule. Eventually we will be able to build a big plant and produce material at lower cost; but it all starts by animating the technology and proving its usefulness at a smaller scale. You can’t start by building the plant and then hope to fill it up with volume...”

1 <https://www.youtube.com/watch?v=NXI7sC9fRJU>

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Patagonia, Gore, and DST are all participating in the development, testing, and validation of Checkerspot's materials. There are discussions with The North Face, but it takes a lot of inbound conversations and months to get to an agreement. Checkerspot has a very clear point of view on how they will build out the company, by bringing partners along to show them what they are able to achieve the performance outcomes. Animating that technology is important to the consumer when raising money and bringing other partners along and not just talking about that performance, but showing them that you can actually do it leads to the right conversations.