



# University of Pittsburgh

ID: 3841

Featured Inventors: Blake Dube & Christopher Wilmer, PhD



*big things come in little cans...*

## Value Proposition

Our product is a portable oxygen device for first responders, military personnel, and professional and amateur athletes. Current oxygen tanks are high pressure, heavy, bulky, and dangerous; our product is a low pressure solution that is lightweight and portable. Our product offers a safe, portable oxygen supply for use in any situation.

## Market Opportunity

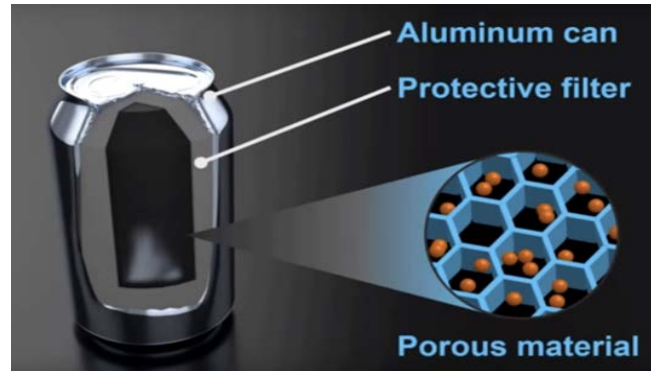
The global oxygen storage and oxygen therapy market is \$7 billion and expected to grow with a CAGR of 11%. Athletes are supplementing their exercise with non-medical grade oxygen to enhance performance and to recover quicker. The exercise oxygen market alone is expected to reach \$2.8 billion by 2022. Professional athletes as well as amateur athletes and adventure sport enthusiasts are using supplemental oxygen for a boost in competition. Military personnel require a compact oxygen supply as a part of their Personal Protective Equipment in case of emergency, and current devices lack the portability and capacity to provide sufficient oxygen therapy. Military equipment does not require FDA approval for use, giving our product a clear path of entry.

## Competitive Landscape

Current market solutions are pressurized oxygen canisters. These tanks are bulky and can be dangerous due to the high pressures at which they operate. If exposed to heat or impact, the tank may rupture or ignite. There are several exercise related oxygen devices that are compact and portable, but lack a large enough volume of oxygen to be useful. Military and Firefighting applications lack portability, which makes them cumbersome to carry. Our product is different because it is lightweight, portable, and disposable. Our technology allows us to create an oxygen delivery system at the fraction of the cost and size than current solutions on the market.

## IP Landscape

Provisional Patent Application No. 62/315,068  
"System for portable oxygen storage and delivery"  
Filed March 30, 2016



## Technology

We use porous materials to concentrate medical oxygen in a simple aluminum soda can at low pressure. The oxygen container fits into a proprietary adapter that connects to the user's existing cannula. The adapter allows the user to adjust flow rate and view the amount of oxygen left in the device.

Our technology takes advantage of a universal property of gases; they concentrate on surfaces. Therefore, we can increase the amount of oxygen that we can fit in a tank by increasing the internal surface area. Porous materials allow us to do just that. Their millions of tiny pores allow oxygen molecules to pack closely together, dramatically increasing the amount of oxygen we can fit in a tank.

## Stage of Development

Our team has seen success in the *Randall Family Big Idea Competition* and the *Pitt Innovation Challenge*. We are currently developing a prototype and are participating in Blast Furnace, a student accelerator program.

## Funding

- Randall Family Big Idea Competition (\$25,000)
- Pitt Innovation Challenge (\$25,000)

# FEATURED INVENTORS:

## *Blake Dubé*

Blake Dube is a 4<sup>th</sup> year undergraduate in the Department of Chemical Engineering. As an undergraduate researcher in the WilmerLab, Blake co-invented rediPOD with Dr. Christopher Wilmer. He continued to develop the product in chemical product design courses (CHE 0314 & 0414) led by Dr. Eric Beckman. Blake is a Brackenridge Fellow, as well as a Chancellor's Undergraduate Teaching Fellow, the latter of which has given him the opportunity to serve as a Teaching Assistant to CHE 0314 and develop new additions to the course curriculum. Blake led his product team to secure funding in the *Randall Family Big Idea Competition* and the *Pitt Innovation Challenge*.

### Education

University of Pittsburgh, Chemical & Petroleum Engineering, BASc (expected 2017)

## *Christopher Wilmer*

Dr. Wilmer is an Assistant Professor in the Department of Chemical Engineering. The *WilmerLab* leverages high performance computing tools to develop advanced materials for gas storage and separation. Before joining the University of Pittsburgh, Dr. Wilmer co-founded NuMat Technologies, a company that provides gas storage solutions for industry. He spoke at Google's "Solve-for-X" annual meeting, rang the closing bell at the NASDAQ, and was named to Forbes Top 30-under-30 list in Energy Innovation. He is excited to involve his students in the translation of academic research to real world applications.

### Education

University of Pittsburgh, Chemical & Petroleum Engineering, Assistant Professor 2014 – present

Harvard University, Chemistry & Chemical Biology, Postdoctoral Fellow 2013 – 2014

Northwestern University, Chemical & Biological Engineering, PhD Candidate 2007 – 2013

University of Toronto, Engineering Science, BASc 2002 – 2007

### Publications

1. C.E. Wilmer, M. Leaf, C.Y. Lee, O.K. Farha, B.G. Hauser, J.T. Hupp, and R.Q. Snurr, *Nature Chemistry*, 4, 83-89 (2012).
2. C.E. Wilmer, O.K. Farha, T. Yildirim, I. Eryazici, V. Krungleviciute, A.A. Sarjeant, R.Q. Snurr and J.T. Hupp, *Energy & Environmental Science*, 6, 1158-1163 (2013).
3. O.K. Farha, I. Eryazici, N.C. Jeong, B.G. Hauser, C.E. Wilmer, A.A. Sarjeant, S.T. Nguyen, R.Q. Snurr, S.T. Nguyen, A.Ö. Yazaydin, and J.T. Hupp, *Journal of the American Chemical Society*, 134, 15016-15021 (2012).

### Innovation Institute

Janice Panza, PhD  
Technology Licensing Manager  
(412) 648-2225  
[jpanza@innovation.pitt.edu](mailto:jpanza@innovation.pitt.edu)

### Innovation Institute

1<sup>st</sup> Floor Gardner Steel Conference Center  
130 Thackeray Avenue  
Pittsburgh, PA 15260  
(412) 383-7670  
[www.innovation.pitt.edu](http://www.innovation.pitt.edu)