

Team: BioactiVT**Industry:** Global Healthcare**Traction**

- **Founding date** – October 20th, 2014
- **Prototype** – YES
- **Beta Users** – Field study in developing world
- **Customers/Channel Partners** - Non-profit organizations
- **Certifications** - FDA 510k certification will be sought
- **Patent Filing** - BioactiVT holds a provisional patent for a thermoelectrically powered pulse oximeter, and plans to patent elements of the solar-powered device as well

In the News

1. “Virginia Tech students develop medical prototype, winning second place in world competition.”
<http://tinyurl.com/o4xc9kk>
2. “Students Work Together to Bring Better Resources to Surgeons in Developing Countries”
<http://tinyurl.com/h5szbr3>
3. “BioactiVT: Engineering Medical Solutions”
<http://tinyurl.com/hnnxn9>

Awards**2nd Place** - Engineering World Health Annual Design Competition 2015**Financing Plan:**

Our current financing plan is based on funding received from Virginia Tech and several sponsors. In order to attract these sponsors, BioactiVT has developed a sponsorship package detailing annual proceedings and an incentive program.

Business Description

BioactiVT is a multidisciplinary design team that addresses medical problems using engineering solutions. The team has developed a solar-powered pulse oximeter for use in developing nations. Pulse oximeters are essential for monitoring pulse and blood oxygenation levels, but more than 77,000 operating rooms worldwide lack them, and 31.5 million operations are conducted without them each year, leading to 100-1,000 times more deaths per capita in developing nations [1][2].

Value Proposition

Currently available pulse oximeters are designed for hospitals in developed nations, making them unsuitable for healthcare facilities of developing nations due to:

1. Lack of power and waste management infrastructure
2. Improper sanitation of devices
3. High initial and lifetime costs of current devices

The team’s oximeter specifically addresses these problems by incorporating self-sustaining solar cells, a unique sanitation method, and a low price.

Company Background

BioactiVT is a biomedical design team founded in 2014 by Virginia Tech students. Its mission is to develop novel, implementable solutions for medical problems through an interdisciplinary approach. BioactiVT is working on several projects targeting both global and domestic healthcare needs.

Management

<p>Priya Venkatraman <i>Co-Founder and President</i> B.S. in Materials Science and Engineering, 2016 Minor: Biomedical Engineering</p>	<ul style="list-style-type: none"> ● Created personalized diagnostic treatment for HIV/AIDS for use in developing regions ● Conducted biomaterials research at National Center of Competence in Research (Switzerland) and Virginia Tech (USA) ● Worked with Virginia Tech Intellectual Property (VTIP)
<p>Jay Pennington <i>Vice President of Partnerships</i> B.S. in Computer Engineering, 2017 B.S. in Mechanical Engineering, 2017</p>	<ul style="list-style-type: none"> ● Directed integration of mission teams at NASA summer academy ● Analyzed labor and presented results to engineers and estimators at Shickel Corporation ● Managed \$200,000 manufacturing engineering project for Harmon, Inc ● Wrote, edited, and reviewed technical documentation for Virginia Tech IT
<p>Andy Cohen <i>Vice President of Project Implementation</i> B.S. in Mechanical Engineering, 2018 Minors: Biomedical Engineering, Engineering Science and Mechanics</p>	<ul style="list-style-type: none"> ● Managed, presented several semesterly product design projects ● Wrote comprehensive technical documentation on redesigned CNC machine, drafted provisional patent figures ● Extensive experience with prototyping, design for manufacture (DFM)
<p>Jorge Cadena <i>Vice President of Development</i> B.S. in Electrical Engineering, 2015 M.S. in Electrical Engineering, 2016</p>	<ul style="list-style-type: none"> ● Research/teaching assistant for several signal processing courses at VT ● Designed circuitry to gather, condition ECG signals from fish on Carilion Research Institute's Antarctic expedition ● Extensive experience in digital/analog filter design and efficient implementation in microcontrollers, microprocessors, and FPGAs

Products/Services

BioactiVT's pulse oximeter offers several advantages over current models. First, the device's self-sustaining combination of solar cells and rechargeable lithium-ion batteries eliminates its dependence on a robust power grid. Moreover, it eliminates the need for effective waste management to dispose of environmentally-hazardous disposable batteries. Second, the device provides an alternative to traditional sanitation methods: all surfaces in contact with the patient can be detached from the device and effectively sanitized with either traditional chemical sanitization methods or placement in boiling water. Third, these unique approaches to sanitation and power reduce the device's lifetime cost. There is no cost to power the device in the form of batteries or electrical supply, and the device can be sanitized without costly chemical wipes or disinfectants. Additionally, the product will be sold for 100 dollars, easily outcompeting existing products.

Intellectual Property/Special Know-How

The design and technology behind the product is being finalized, and the team aspires to patent the device's unique method of sanitation in combination with the solar power aspect. Due to the more recent development of this product, prior art searches are currently being performed, and patent filing is in the near future. BioactiVT also holds another provisional patent for a thermoelectrically generated pulse oximeter.

Markets

BioactiVT aims to sell its pulse oximeter to organizations that work with developing nations, such as PATH, USAID, the Bill & Melinda Gates Foundation, and the UN. The need for these devices is high in developing nations. In Uganda, 75% of anesthesia providers listed pulse oximeters as their most frequently unavailable item [2]. The market is also growing in the region; between 2008 and 2014, healthcare spending in Africa rose sharply from \$75 billion to \$112 billion, an increase of almost 50% [3]. BioactiVT is confident that our device will meet the market demand of developing nations.

Sales and Marketing

BioactiVT works with communication and outreach specialists to develop marketing channels and partnerships. The team travels to medical conferences throughout the year to present new products, and many of our target organizations also attend these conferences. For example, at a previous competition in Houston, our product piqued the interest of a USAID representative. We continue to use these events as opportunities to showcase our designs and network with potential buyers.

The team has prepared product literature to distribute to potential consumers, and has also established its brand through its website, copyrighted logo, and social media presence. BioactiVT participates in numerous on-campus events to generate interest among students and faculty. The team also presents to the Virginia Tech Student Engineers' Council each semester on its projects and goals to gain standing in the engineering community on campus.

Competition

BioactiVT's device primarily faces competition from the makers of Lifebox, another pulse oximeter. Unlike Lifebox's design, our product does not depend on either an electric grid or expensive and environmentally-destructive disposable batteries. Additionally, our design exceeds the sanitation abilities of Lifebox through detachable mechanisms.

References

- [1] World Health Organization, "Global Pulse Oximetry Project," 2008. [Online]. Available: http://www.who.int/patientsafety/events/08/1st_pulse_oximetry_meeting_background_doc.pdf. [Accessed: 27- Feb- 2016].
- [2] LM Funk, "Global operating theatre distribution and pulse oximetry supply: an estimation from reported data. - PubMed - NCBI", *Ncbi.nlm.nih.gov*, 2016. [Online]. Available: <http://www.ncbi.nlm.nih.gov/pubmed/20598365>. [Accessed: 27- Feb- 2016].
- [3] United Nations Office for Project Services, "2014 Annual Statistical Report on United Nations Procurement," 2014. [Online]. Available: https://www.unpm.org/Areas/Public/Downloads/ASR_2014.pdf. [Accessed: 01- Mar- 2016].