

# Michał Swoboda

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## Education

Drexel University

Master of Science, Biomedical Engineering

Philadelphia, PA  
September 2012 - June 2017

**Master Thesis:** Implantable fNIR Platform for Animal Stroke Models

Developed an fNIR neuroimaging implant to observe hemodynamic activity in small animal, stroke models. The device provides a unique platform to study stroke mechanisms in-vivo, during cerebrovascular events.

## Experience

### RightAir, Inc

Chief Technical Officer

Philadelphia, PA  
October 2016 - 2023

- Designed and developed a novel, ambulatory, biphasic cuirass ventilator
- Developed quality management system under ISO 13485 & ISO 14971
- Designed and certified device under IEC 60601-1 (-1-6, -1-8, -1-11)
- Performed clinical trials
- Fundraised and received \$3M from strategic and VC investors

### Product Development Consultant

Engineering Consultant

Philadelphia, PA  
May 2016 - 2019

- Designed device concepts
- Developed electromechanical prototypes
- Validated device functionality & operational characteristic

### Drexel University

Translational Research Engineer

Philadelphia, PA  
March - October 2016

- Interviewed surgeons to establish clinical needs and problems
- Observed surgical procedures & participated in patient rounds
- Developed engineering solutions to clinical problems

### Moss Rehab

Clinical Engineer

Elkins Park, PA  
March - October 2015

- Operated and maintained medical equipment
- Designed devices for clinical evaluation of patients
- Assisted physicians during medical procedures

### NeuroDx Development

R&D Assistant Engineer

Bensalem, PA  
April - September 2014

- Designed & constructed automated testing systems
- Manufactured biosensors for clinical use
- Documented and analyzed explanted biomedical devices

## Skills

**Software:** C/C++, MATLAB, LabVIEW, Python

**Electrical:** Traditional and Multi-layer SMT prototyping techniques, PCB Design and Fabrication, Electrical Circuit Analysis, Electromagnetic Compliance Design and Certification

**Hardware:** Rapid Prototyping using 3D Printing and Traditional Machining, Data Acquisition, Verification Automation, 3D Scanning, Reverse Engineering

## Honors and Awards

**SBIR Phase I** - Principal Investigator

Award Title: MOBILE RESPIRATORY AID DEVICE TO HELP COPD PATIENTS BREATHE EASY AGAIN

Award ID: R43 HL146732-01

Granting Institution: National Heart, Lung, and Blood Institute

This \$225k grant has been awarded to develop and test a novel respiratory aid device (AIR-AD) for moderate and severe COPD patients.

NextFab RAPID Accelerator Award - 2018

NSF Innovation Corps Award- 2018

Ben Franklin Partnership for Rapid Prototyping and Fabrication Grant - 2017

Penn Health-Tech Medical Technology Grant - 2017

Medical Device Accelerator Grant - 2017

Second Grand Prize Wharton Startup Challenge - 2017

Dean's List – 2012 - 2017

## Intellectual Property

IMPROVEMENTS ON RESPIRATORY ASSIST DEVICES [ID: 62-780-608] 2018

The patent includes claims on practical implementation of a mobile respiratory aid device. This includes shell shape, belt and harness system, sensory matrix for breath detection, breath synchronization and triggering, as well as user interface features.

APPARATUS AND METHOD FOR CONTROLLING FLUID PROPULSION [ID: 16-556-300] 2017

The patent includes claims of a novel water propulsion system and water propulsion control method for electrically powered monofins.

## Open Source Projects

**yVent** - <https://github.com/MSwoboda/yvent>

yVent is a pressure-triggered, 3D printable, emergency ventilator. The device has no moving parts and consists of 2 pieces of plastic. It is designed around an aerodynamic behavior known as the Coandă effect (It is a bistable fluidic amplifier). The device produces cyclical pressure changes, which can support patient breathing, while allowing for patient actuation and eliminating the possibility of dissynchrony. The device was designed and developed as a last resort ventilator for major clinical centers in Philadelphia during the beginning of COVID-19 pandemic.