From PhD to CEO; Starting a Biotech Company While Completing a PhD

Michael Johnson – CEO and Co-Founder, Visikol Inc. PhD Candidate
About me

• CEO and Co-Founder of Visikol Inc.
• National Science Foundation Fellow
• PhD Candidate – Department of Environmental Science

Background

• BS in Biology, Muhlenberg College 2011
• Interned at NASA Airborne Research 2011
• Pharmaceutical Packaging Analyst 2011 to 2012
• Teaching Assistant – Rutgers University 2012 to 2013
• Marketing Co-Op – Johnson & Johnson  2013 to 2015
• TEDxJNJ Co-Op – Johnson & Johnson 2015 to 2016
Visikol Inc

- 4 full-time employees
- 5 part-time employees
- $500,000 in Venture Capital Funding
- $275,000 in NSF grant funding
- 1,000 sq ft lab space at CCIT
- 1 issued patent, 1 pending patent

Technology

Tissue Labeling  Tissue Clearing  3D Imaging
How did I create a company while working on my PhD and why?

DISCLAIMER – I had no intention of starting a company or becoming an entrepreneur when I started graduate school.
Started graduate studies because I loved science and realized that to do *real* research I needed to get an advanced degree

**At the beginning:**
No idea where I wanted to go with my career

You are incredibly impressionable

Path for a PhD is long and largely undefined – during/after

You know few PhD’s
The Advisor

Most important decision you make is who your advisor will be.

Important aspects of an advisor to me:

1) Autonomy

2) Diverse set of experiences

3) Mentorship and guidance
My Advisor – Dr. A.J. Both

- Helped me identify funding
- Assisted me in developing a PhD project that would address my passion for applied science

- Suggested that I gain industry experience
  - 3 years of Co-Ops with Johnson & Johnson

- Encouraged me to pursue fields outside of my discipline
  - MBS classes (finance, accounting, marketing)
  - Consulting projects in Argentina
  - *Grants to grow algae in space*
Algae Astronauts

In 2014 I had the idea to send algae into space in a specially designed device to see if I could get them to produce more biofuel in space than they could on earth.

To conduct this project I needed a chemist to help out with algae processing and that is when my Visicol journey began.

Thomas Villani
Visikol® Clears Biological Tissue

Mouse Foot

Mouse Lung

Mouse Brain

Whole Gecko

Arabidopsis Leaf
Winter 2012

• Tom Villani invents Visikol® as a replacement to Chloral Hydrate for the visualization of botanical microscopy samples
• Tom files for a composition of matter patent through Rutgers University
• Tom and his college roommate Nick Crider launch Phytosys LLC to commercialize Visikol as a reagent for plant biology researchers
• Phytosys acquires the exclusive rights to Visikol® from Rutgers University
2013 to 2014

• Tom and Nick sell Visikol® as a reagent to over 150 plant biology researchers from around the world

• While the company is quite happy with their progress, selling a replacement to chloral hydrate is a small market

• When Tom invented Visikol® he knew it could be used to render animal tissues transparent, but the business case for this was not there yet
2014 – The Triumvirat

• When I met with Tom in 2014 to discuss sending algae into space we immediately hit it off

• I wanted to be part of what Tom and Nick were doing and jumped in right away

• I worked with Tom and Nick to quickly find out how to monetize and grow the Visikol® technology
2014 – The Shotgun Approach

• We looked into every single market to figure out where Visikol® could add value from taxidermy to embalming

• Eventually we came up with the two markets that would define our entire company: Toxicology and 3D Histology
Visikol® TOX™ Platform - Toxicology

Current Approach: 34 – 52 days

- Animal Growth, Reproduction, & Testing: 20 – 31 days
- Skeletal Visualization: 14 – 21 days

Approach: 22 – 37 days

- Animal Growth, Reproduction, & Testing: 20 – 31 days
- Skeletal Visualization: 2 – 6 days

- Skeletal visualization is the bottleneck of this process
- Visikol allows a CRO to increase throughput by 29-35%
Visikol® HISTO™ Platform – 3D Histology

**Traditional 2-D Histological Imaging**
- Tissue (e.g. biopsy) → Sectioning → Staining + Microscope
- < 1% of tissue analyzed
- >10% of the time cancer is misdiagnosed *

**Visikol-based 3-D Histological Imaging**
- Tissue (e.g. biopsy) → Clearing → Staining + Microscope
- 100% of tissue analyzed
- More accurate and complete picture of disease

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3D Histology – Visikol® HISTO™

Micro-tissue

Owl Brain Neurons

Mouse Cerebellum

Micro-tissue
2015 – Creating a Business

By early 2015 we had figured out the following:

• Significant customer need for both of our technologies
• Large market for both of our technologies
• There were a lot of questions we needed to answer before we could commercialize these new technologies

We then started to craft a business plan to define our path forward and to get investor funding

We had the beginnings of a biotech business...
February 24th 2016

- We secured $500,000 in VC funds and officially launched Visikol Inc

- Moved into our own lab at CCIT
Where we are at and where we are going

300+ Visikol HISTO beta testers/customers
  • Successful use with numerous tissues and labels
  • 1 publication to date

Product suite of 8 Visikol HISTO reagents/kits
  • Visikol HISTO clearing agents
  • Visikol HISTO starter kit
  • Visikol HISTO labeling buffers

3 companies pilot testing Visikol TOX

Focused on providing researchers with more accurate and complete information from tissues and improving diagnostic imaging
What is the purpose of getting a PhD?
A PhD is way of thinking
Is the current paradigm for a PhD supporting this?

Warning – gross over-generalization

• 1-2 years of taking classes and rotating in labs
• 2 years of working on your PI’s research projects
• 2 years of your PhD project

What is this current paradigm preparing PhD’s for?
Path from Academia

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<th>Hours</th>
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Warning – gross over-generalization
How do we better prepare PhD’s?

1. **Exposure** – PhD’s should be exposed to all options – many are limited by their PI’s
   1. Seminars
   2. Co-ops
   3. Interdisciplinary projects/clubs

2. **Development Plans** – There should be a formalized process for tracking PhD development and progress
   1. Monthly 1 on 1 meetings
   2. Network building

3. **Interdisciplinary Projects** – Focus on doing work not related to ones PhD work
   1. Collaborations with different types of researchers
   2. Business case studies
How was I able to do what I did?

1) Very supportive advisor who encouraged me to pursue many opportunities

2) Developed industry skill set through experience at J&J

3) Understood business through MBS classes

4) Experience managing teams through interdisciplinary projects

5) Freedom to pursue Visikol through NSF IGERT Fellowship
Summary – Key Components

- Advisor
- Interdisciplinary Research Experience
- Core – Discipline Research
- Business Skills
- Industry Experience
Thanks! – Questions?

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