

CALIFORNIA STATE UNIVERSITY SAN MARCOS

PROJECT SIGNATURE PAGE

PROJECT SUBMITTED IN PARTIAL FULLFILLMENT  
OF THE REQUIREMENTS FOR THE DEGREE

MASTER OF SCIENCE

IN

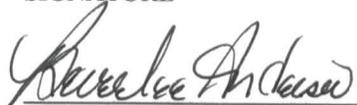
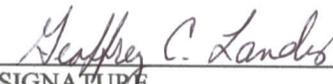
BIOTECHNOLOGY

PROJECT TITLE: Research and Evaluation of the Market's Interests for the PGC Kit

AUTHOR: Minh Q. Huynh

DATE OF SUCCESSFUL DEFENSE: April 19th, 2013

THE PROJECT HAS BEEN ACCEPTED BY THE PROJECT COMMITTEE IN  
PARTIAL FULLFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF  
MASTER OF SCIENCE

Dr. Betsy Read		5/10/13
PROJECT COMMITTEE CHAIR	SIGNATURE	DATE
Dr. Matthew Escobar		5/13/13
PROJECT COMMITTEE MEMBER	SIGNATURE	DATE
Dr. Beverlee Anderson		5/14/13
PROJECT COMMITTEE MEMBER	SIGNATURE	DATE
Dr. Geoffrey Landis		5/9/2013
PROJECT COMMITTEE MEMBER	SIGNATURE	DATE

# EXECUTIVE SUMMARY

## Research and Evaluation of the Market Interests for the Pollen Growth Cell Fertilization Kit



**Minh Q. Huynh**

March 28, 2013

### Professional Science Masters

California State University, San Marcos

Seacoast Science Inc. developed a micro system-based assay that allowed users to analyze the plant fertilization process in real-time. Since the product is in the developmental phase, the product designer wanted to find out the most suitable target market for this product; therefore, the project's goal was to research and analyze the market interests for the Pollen Growth Cell (PGC) Fertilization Kit. The study began by examining three major markets. Within the San Diego area, three target markets were selected based on the user's needs and equipment availability, these include nearby high schools, community colleges, and plant related research companies. To begin, brochures and flyers were sent to potential users as a form of first line marketing stratagem to stimulate interests. PowerPoint presentations were created to introduce the capabilities of the micro-device to three different audiences: high school teachers, college professors, and industry professionals. At the end of the presentation, a questionnaire was given to the interviewees to measure the interest levels and appropriateness of the micro-device. Interview responses were compiled and analyzed to gauge the interest level and market potential for the micro-device assay. Feedback from high school teachers and college professors, even with the most simplified packaging option, concluded that the PGC Fertilization Kit was too sophisticated for high school and community college students. Due to the semester-in-residence's time constraint, there was not enough time to interview a professor at the university level. The most promising market segment was the agriculture and plant genomics research and development companies. These companies were the most likely to employ the PGC Fertilization Kit.

# **Pollen Growth Cell (PGC) Fertilization Kit**

Masters Degree in Biotechnology

May 14th, 2013

**Minh Huynh**

California State University, San Marcos

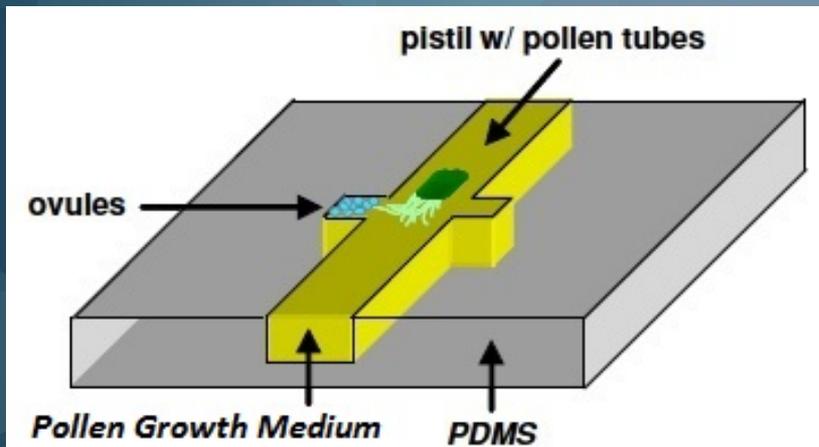
# Agenda

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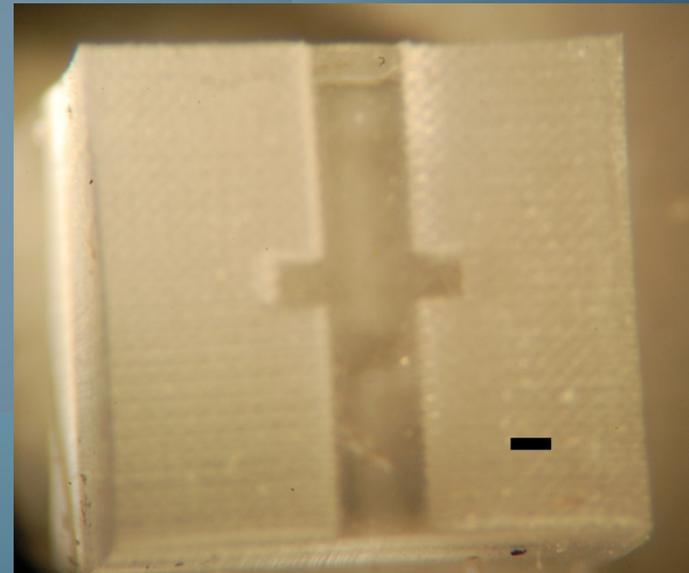
- Introduction
- Thesis focus
- Methodology
- Results
- Discussion
- Questions and Comments

# Introduction

- A micro system-based assay (PGC Fertilization Kit)
  - Developmental phase

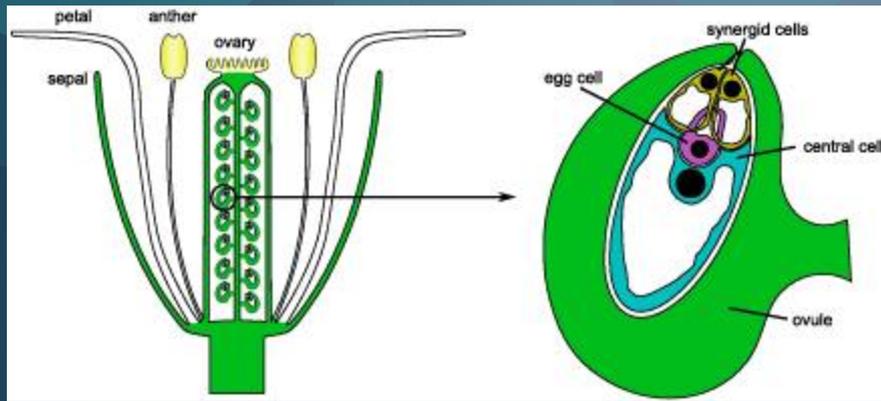


**Figure 1.** A schematic layout of a typical microdevice designed to support pollen tube growth featuring a microchannel for pistil placement and side chambers for ovules

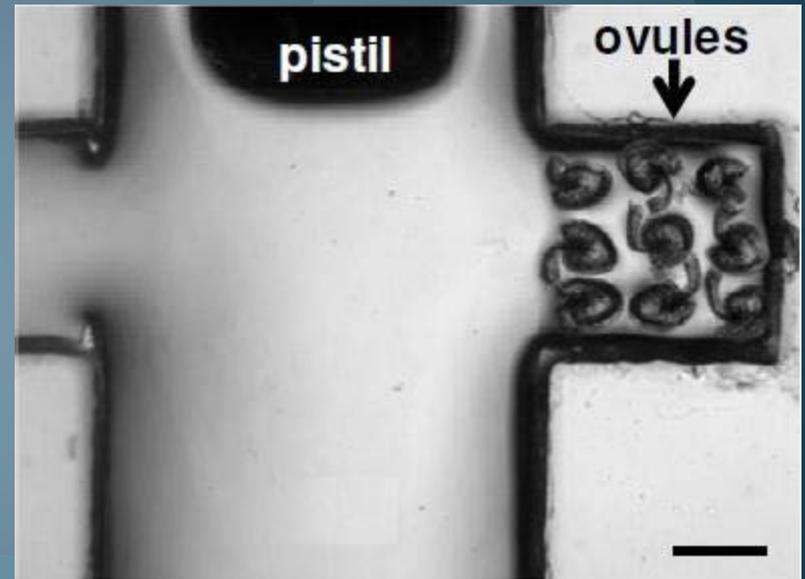


**Figure 2.** A Pollen Growth Cell Fertilization micro-device under a light assisted microscope. The magnification level used to produce the picture was 40X. Scale bar, 250  $\mu\text{m}$ .

# Introduction

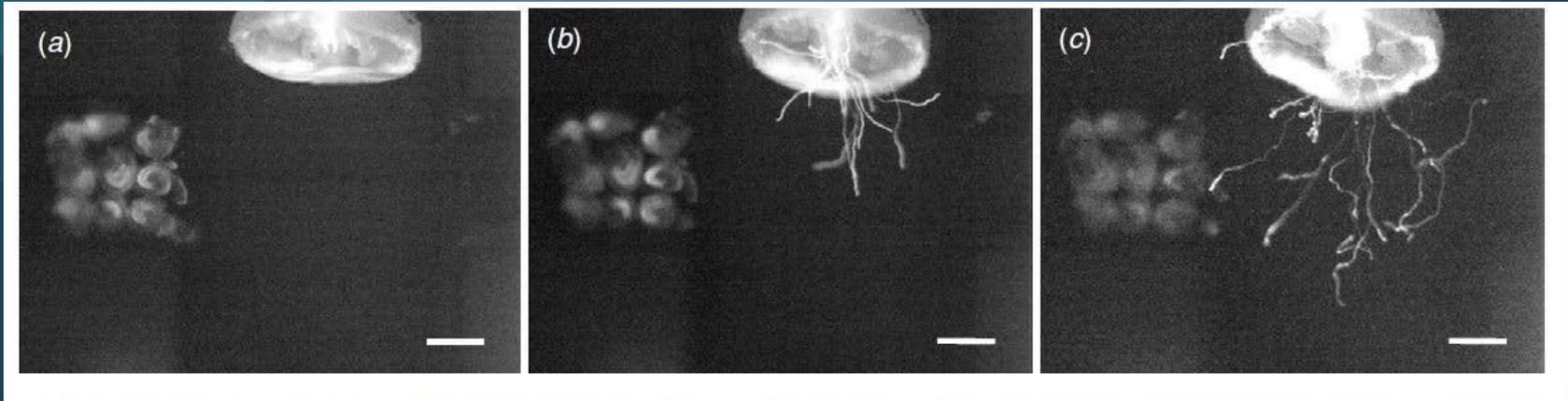


**Figure 3.** An animated diagram of *Arabidopsis A. Thaliana* and crossed section of an ovule



**Figure 4.** A micrograph of a fabricated microdevice filled with pollen growth medium (PGM); a pollinated pistil and ovules are placed in preparation for pollen tube guidance assay. Scale bar, 200  $\mu\text{m}$ .

# Introduction



**Figure 6.** A time-lapse image sequence of pollen tube growth in a microdevice, with ovules in the left chamber and an empty right chamber, following incubation time of (a)  $t = 0$ , (b)  $t = 4.5$  h, and (c)  $t = 18$  h. Scale bar,  $200 \mu\text{m}$ .

# Thesis Focus

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- A micro system-based assay (PGC Fertilization Kit)
  - Developmental phase
- Research and Evaluation of Market Interests
  - Three major markets
    - High school level
    - College level
    - Plant-related companies

# Methodology

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- The Questions
  - Is there any potential market interests?
    - How useful is this product to the users?
      - High schools and colleges
        - Adequate classroom equipment?
        - Skill and knowledge level?
        - Appropriate for curriculum?
      - Professional industries
        - What are they looking for?
        - Would this product fulfill those needs?
        - Any modifications?

# Methodology

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- Brochures and Fliers
  - Customized to each level
- Survey questionnaires
  - Pre and post meeting
    - [www.surveymonkey.com](http://www.surveymonkey.com)
    - Short and long version for high school teachers
- Phone calls and emails
  - Follow-up
  - In-person meeting

# Results – High Schools

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- Limited time issues
  - The California's Standardized Testing and Reporting (STAR)
    - Multiple science subjects
- Limited resources
  - Equipments
- High interest in conceptual aspects

# Results – Community Colleges and Industry Professionals

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- High interest in conceptual aspects
  - Video clips
- Not appropriate for General Biology laboratories
- Suggestions:
  - Plant Biology courses
  - Molecular Biology courses
  - Graduate level
- Product not useful to the company

# Discussion

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- The PGC Kit does not have a strong market at the high school level
  - Too sophisticated for high school students
  - Lack of adequate equipment
- Need more research on college level market
  - Build more connections
  - More interviews
  - Graduate level
- Industry level
  - More market research needed
  - Outside of San Diego



*Any Questions/Comments?*