Invigorate the undergraduate teaching assistant experience

Monika Oli, PhD and Amanda Ojeda, BSc
It’s an Endeavor – Microbiology Labs @ UF

- 3 Levels of microbiology labs (MCB2000L/3020L/3023L)
- 25 Section of Microbiology Labs (n=36)
- >200 Undergraduate Teaching Assistants/year
- >2500 Student benefit/year from UTAs assistance
- >900 Microbiology majors in 2 colleges
- >900 Agar plates made in house
- 13 New Graduate students per year
- >50,000 Agar plates made in house
Our Microbiology Lab Curriculum includes....

- Inquiry-based modules
- Active Learning
- Interdisciplinary
- Communication Skills
- Heavy use of Technology
- Bioinformatics foundations
- Research-Based Learning
- Independent Research Projects
- Global Understanding
- Sense of Community
- Creativity
- Career preparation
- (Field Trips)

Reinventing Undergraduate Education: A Blueprint for America's Research Universities
Learning by teaching others is extremely effective - a new study tested a key reason why

“assess the importance of retrieval practice across a variety of teaching scenarios and activities.”
Other models to prepare TAs for teaching?

Learning assistant model (Colorado) [https://www.colorado.edu/program/learningassistant/](https://www.colorado.edu/program/learningassistant/)
Learning assistant alliance [https://learningassistantalliance.org/](https://learningassistantalliance.org/)

Learning Assistants are undergraduate students who, through the guidance of weekly preparation sessions and a pedagogy course, facilitate discussions among groups of students in a variety of classroom settings that encourage active engagement.

Learning Assistant Model of Teacher Education in Science and Technology, NSF Grant, 2006, U Colorado Boulder
Teaching Assistant vs Learning Assistant

Help teacher teach

Helps student learn

Our integrated model

- Student Teacher
- Educator
- Subject expert
- Motivator
- Evaluator
- Listener
- Mentor
- Facilitator
- Counselor (through guidance and training TA’s can identity changes in student behavior and notify someone)
- Role model (mentorship)
- Share Enthusiasm
- Self Discovery
- Apprentice

Teaching is an art and science!
1st year PhD students in MCS

- Take classes
- Rotate in research lab
- Teaching assistant for 2 lab sections
Teaching assistants help microbiology students enter their data into their computers during a lab. We strive to provide students with the best learning experience.

UTA Rules ......

......to comply with federal, state, and university regulations, their roles must be carefully restricted and supervised......

http://fora.aa.ufl.edu/docs/38/2012-2013/UG%20TA%20Policy%20082812.pdf
So you decided to become a UTA for Microbiology Labs......

- Prerequisites
- Requirement - Expectations
- Application process (online app)
- Selection process
- Class registration (MCB4934 supervised Teaching) – or volunteer
  - Canvas course
- TA workshop (2 days)
- Lab duties

....sorry, we are already full.......
## Evaluation of Learning

<table>
<thead>
<tr>
<th>Activity Types</th>
<th>Percent of grade</th>
</tr>
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<tbody>
<tr>
<td>Attend workshop prior to labs and complete online training</td>
<td>10</td>
</tr>
<tr>
<td>Punctuality and attendance of labs</td>
<td>10</td>
</tr>
<tr>
<td>Execute lab responsibilities and follow dress code</td>
<td>20</td>
</tr>
<tr>
<td>Execution of assigned tasks like grading, communication with GTA/students, office hours</td>
<td>20</td>
</tr>
<tr>
<td>Anonymous student and GTA feedback (numerical value from Qualtrics survey)</td>
<td>10</td>
</tr>
<tr>
<td>Teaching Module</td>
<td>10</td>
</tr>
<tr>
<td>Teaching ePortfolio and reflection</td>
<td>20</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100</strong></td>
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TA workshop
(2 full days for GTAs and UTAS)

Introductions – bonding, get to know the team
Teaching philosophy
Lab safety and resources
Guest speakers: DRC, you matter we care, graduate school, chair

Canvas and training time
Team building activity
Good/bad TA activity
“Seasoned TAs” – share experience
Lab orientation – stock room, instrumentation, logistics
Hands on training lab math, microscope, ....
Debrief and support
What makes a bad TA?
GTA – weekly meeting

- Review upcoming teaching material, refresh experiments
- Discuss students issues
- Active learning strategies
- Professional development
- Moral support - mentoring
UTA - GTA online class - semester

TRAINING – DECISION MAKING

ELEARNING PLATFORM CANVAS AS INSTRUCTOR

MENTOR ACCOUNTABILITY

USE INSTRUMENTATION AND EQUIPMENT

TEACHING TIPS & EXPERIENCE (PEDAGOGY)

PROFESSIONAL COMPETENCIES

E-PORTFOLIO – TEACHING REFLECTION CREATIVITY

MENTAL HEALTH AWARENESS

QUANTITATIVE SKILLS

GLOBAL APPLICATIONS

REAL LIFE APPLICATIONS

TECHNICAL SKILLS
Professional competencies

• Communication (oral and written)
• Teamwork and interpersonal skills
• Leadership
• Creativity and problem solving
• Professionalism and productivity
• Global perspective
• Motivation
• Empower others
• Manage change
• Interpersonal awareness

• Collaboration
• Information Gathering
• Analytical Thinking
• Conceptual Thinking
• Strategy
• Technical Expertise
• Initiative
• Innovation
• Decisiveness
• Self Management
• Thoroughness
• Flexibility
• Stress Management
Research vs. Teaching Experience

Research
• Report writing
• Data collection
• Analysis of information from different sources
• Finding information off the internet
• Critical thinking
• Planning and scheduling
• Critical analysis

Teaching
• Patience
• Adaptability
• Imagination
• Teamwork
• Risk Taking
• Constant Learning
• Communication
• Mentoring

The Undergraduate Teaching Assistant Experience Offers Opportunities Similar to the Undergraduate Research Experience (JMBE 2009)
<table>
<thead>
<tr>
<th>UF CORE EXPERIENCE 1</th>
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<tbody>
<tr>
<td><strong>H, 3 CH</strong></td>
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<tr>
<td>Exploration of Meaning and Values of Life as Individual and Member of Local and Global Communities</td>
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<table>
<thead>
<tr>
<th>UF CORE EXPERIENCE 2</th>
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</thead>
<tbody>
<tr>
<td><strong>B/P or S, N, 3 CH</strong></td>
</tr>
<tr>
<td>Exploration of the World and its Needs</td>
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<tr>
<td>(Choose one course)</td>
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<thead>
<tr>
<th>UF CORE EXPERIENCE 3</th>
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<tbody>
<tr>
<td><strong>0-3 CH</strong></td>
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<tr>
<td>Experiencing the World to Improve the Lives of a Larger Community</td>
</tr>
<tr>
<td>(Choose one experience)</td>
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<tr>
<th>UF CORE EXPERIENCE 4</th>
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</thead>
<tbody>
<tr>
<td><strong>Optional</strong></td>
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<tr>
<td>Synthesize Learning in UF Core Experiences 1-3 and in Major</td>
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<table>
<thead>
<tr>
<th>FIRST-YEAR FLORIDA</th>
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<td><strong>FIRST-YEAR FTICs</strong></td>
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<tr>
<th>IUF1000</th>
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<tbody>
<tr>
<td>WHAT IS THE GOOD LIFE</td>
</tr>
<tr>
<td><strong>H, 3 CH</strong></td>
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<table>
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<tr>
<th>GE- NATURAL SCIENCE</th>
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<tbody>
<tr>
<td><strong>B/P, N, 3 CH</strong></td>
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<tr>
<td>CLIMATE CHANGE</td>
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<tr>
<td>TBA</td>
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<th>GE- SOCIAL SCIENCE</th>
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<tr>
<td><strong>S, N, 3 CH</strong></td>
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<tr>
<td>UFIC-LED COURSE</td>
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<tr>
<td>PEOPLE AND DATA</td>
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<tr>
<td>EXTREME EVENTS</td>
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<tr>
<th>INTERNSHIP/ CO-OP</th>
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<th>STUDY ABROAD</th>
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<th>COMMUNITY SERVICE</th>
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<tr>
<th>UNDERGRADUATE RESEARCH</th>
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<th>PUBLIC SERVICE</th>
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<tr>
<th>DESIGN EXPERIENCE AND COMPETITION</th>
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<tr>
<th>FINAL YEAR FLORIDA</th>
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<tbody>
<tr>
<td><strong>SENIOR CAPSTONE COURSE</strong></td>
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<tr>
<th>ePortfolios</th>
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<tr>
<th>Teaching Assistant Experience</th>
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</table>
ePortfolio ➔
Teaching Reflections

Welcome!

Sierra  https://sierrablashock.wixsite.com/mysite
Danielle https://danichism.wixsite.com/teachingportfolio
Cole https://coleferguson317.wixsite.com/eportfolio
From Student to Teacher

"We cannot hold a torch to light another's path without brightening our own."
— Ben Sweetland

My Experiences

Spring 2016: MCB 3023L

During my first semester as a UTA, I assisted in the microbiology lab required only for microbiology and cell science majors. This was great because the students were enthusiastic about the material and eager to learn the techniques. Therefore, I was able to quickly develop strong skills in explaining the laboratory techniques since the students would ask again if my explanation was not clear enough the first time. I also gained much more respect for the teaching profession because I was able to experience first hand all of the work that goes into teaching such as material preparation, assignment and assessment development, grading, and other challenges.

Fall 2017: MCB 3020L

This past semester, I was a UTA for the microbiology lab that non-microbiology majors take. I decided to UTA for this version of lab because there was a smaller time commitment required than the lab for majors. This semester was interesting because I was working with a completely new teaching team, and the students were not as enthusiastic about the material or lab techniques. Most of the students who take this version of the lab take it merely to fulfill a requirement for their pre-professional track rather than out of actual interest in microbiology.

Despite these challenges, I believe that I was able to grow even more as a UTA. Using my precious experience as a UTA, I was able to guide the new members of my teaching team in how to interact with students and best explain the material. In addition, since the students this semester were less likely to ask for clarification about instructions, I learned to be more aware about the subtle signs that students give off when struggling with a concept or technique. I was also able to fine tune the teaching techniques that I had gained the previous semester through additional practice.
August 2003
My dad is traded to a new hockey team so we move to Ingolstadt, Germany. I attend kindergarten and first grade, speaking basic German.

August 2009
My family and I move to Fribourg, Switzerland. My sister is born soon after we arrive. I go to preschool, where I start speaking conversational French.

August 2006
After my dad retires from hockey, we move back to America. We spend the next two years in Philadelphia.

July 2008
My family and I move to Orlando, Fl...I enter fourth grade. I begin playing tennis.

August 2013
First Day of High School. Over the next four years, I participate in tennis, cross country, and band. I volunteer at Give Kids the World village over the summer.

Summer 2017
I graduate high school. Three months later, I move into my dorm at the University of Florida.

January 2018
I meet Dr. Haynie and start working in his lab. I process data to study the effects of smoke on neuromuscular junctions.

May 2018
I fly out of Orlando to study abroad in Europe. This is my first time back since 2006. Learn more about my trip under "Global Experience".

Fungi Scavenger Hunt

- **Mycorrhizae**
  - Location: the shaded, swampy woods near the Reitz Union
  - symbiotic relationship between fungus and plant roots
  - promotes nutrient uptake from soil
  - essential for plant photosynthetic efficiency

- **Mold**
  - Location: the peel of an orange in a wooden box
  - can spoil food & damage property
  - can cause disease and allergic reactions

- **Basidiomycota**
  - Location: the stump of a tall Cypress tree in Yulee Area
  - Mushrooms are sexual reproduction structures
  - decompose wood
  - essential in carbon and nitrogen cycles
Teaching Statement

As a teaching assistant, my philosophy revolves around helping make the learning experience for students as impressionable and absorptive as possible. As a student myself who often wonders "Why?", I hope to help students be able to obtain the knowledge in order to ask why about things too. I truly believe questioning "Why?" certain processes are done in ways shows true curiosity of understanding. I believe that this thought process is how research is done, and we need the foundational knowledge in order to question and think creatively to spark new discoveries.

This is also why I chose to teach a laboratory class, where learning and hands on skills are combined. I sought to make sure students understood fundamental diagnostic data would be more accurate than the traditional, however the traditional tests were still important quick tests that are give sufficient information on the bacterium. In another instance, I told the students before an upcoming midterm to understand what the traditional diagnostic tests are showing because the point of practicing identifying the tests in class was also to prepare for the midterm where examples would be given and students would have to analyze the tests themselves.

My strengths as a teacher include attentiveness, in which I am always attentive to which students in a large class room need help. I am responsible, in which I am always on time to class and prepared for the day’s lesson, including making sure to submit quizzes to the class on time as well. Most importantly, my strengths include that I am adaptable to the student’s
How to pass on MY teaching philosophy?

UTAs help significantly to pass on my teaching philosophy to GTAs because they have taken the labs before.
UF is #8

• The student-faculty ratio at University of Florida is 19:1, and the school has 48 percent of its classes with fewer than 20 students.

• ......NOT in most STEM undergraduate classes
As University of Florida aims for Top 5, here are reasons why

Our student instructor ratio is 6:1 in the microbiology lab

.....but UTAs are NOT officially counted to improve the ratio
“The TA experience can be an outstanding way to learn the art of teaching and to have a positive influence on many students”
I get feedback, inspiration and new ideas from UTAs.

Teaching is a 2-way street.
What I tell my UTAs......

our program would not function without them!
Questions
Invigorate the undergraduate teaching assistant experience

Monika W. Oli*, Department of Microbiology and Cell Science, University of Florida
Amanda E. Ojeda, Department of Microbiology and Cell Science, University of Florida

(postor or oral presentation)

Inquiry-based laboratory curricula employing active learning strategies have proven to enhance deep learning, learner-centeredness, and critical thinking. However, it demands a very different teaching strategy and also more one-on-one engagement between the students and the instructors. Per semester, we offer ~25 lab sections, made of 36 students each, to over 40 majors on campus which demands considerable student-instructor ratio (~ 6:1) and adaptability to meet the needs of different students' backgrounds and educational pursuits. In order to effectively teach these modern, cutting-edge microbiology labs, we have established “Teaching Teams”, consisting of graduate teaching assistants (GTAs), undergraduate teaching assistants (UTAs), and lab management. To formalize this approach, we have developed a curriculum that further enhances the UTA's experiences by training them in scientific and professional competencies, familiarizing them with the use of instrumentation and advanced technology, helping them develop interpersonal skills, and enhancing their teaching aptitude through classroom experience and online modules. The culmination of the semester is the creation of an ePortfolio with a personal reflection on their teaching experience. UTA contribution to the teaching team heightens the students' laboratory experience by providing individualized support throughout the learning process and creates a more nurturing atmosphere. This multidimensional teaching experience positively impacts the UTA's future profession through the development of lifelong skills not obtained in a traditional student role. Our UTA opportunity makes students more empowered and competitive for STEM graduate and professional degree applications.
The Ecosystem of teaching
Publish

  - Triplett [https://evolllution.com/revenue-streams/distance_online_learning/the-stem-education-landscape-identifying-the-major-barriers-to-online-stem-degree-programs/](https://evolllution.com/revenue-streams/distance_online_learning/the-stem-education-landscape-identifying-the-major-barriers-to-online-stem-degree-programs/)
- [https://er.educause.edu/columns/transforming-higher-ed](https://er.educause.edu/columns/transforming-higher-ed)
The original labels for Dale’s ten categories are:
Direct, Purposeful Experiences;
Contrived Experiences;
Dramatic Participation;
Demonstrations;
Field Trips;
Exhibits;
Motion Pictures;
Radio; Recordings;
Still Pictures;
Visual Symbols;
Verbal Symbols.

The student experience contributes directly to their physical, mental, emotional and social wellbeing and resilience. Learning takes place in a climate focused on collective wellbeing of school, community and society.

High quality curriculum, assessment, teaching and learning support students in developing greater independence in learning and in meeting the challenges of life beyond school, of further education, and of working life.

The school’s junior cycle programme is broad enough to offer a wide range of learning experiences to all, and flexible enough to offer choice to meet the needs of students.

The educational experience is inclusive of all students and contributes to equality of opportunity, participation and outcomes for all.

All students experience a high quality education, characterised by high expectations of learners and the pursuit of excellence.

Curriculum, assessment, teaching and learning enables students to build on their learning to date, recognises their progress in learning and supports their future learning.

The experience of curriculum, assessment, teaching and learning encourages participation, generates engagement and enthusiasm, and connects with life outside the school.

Curriculum, assessment, teaching and learning provide opportunities for students to be creative and innovative.

HISD Teaching & Learning Framework

District Curriculum
Best Practices
Learner Profile
Curriculum Design Framework
Leadership Practices
Classroom Management
Professional Development Plan
Quality Teaching and Learning
Teaching and Learning Accountability
Four Domains of Global Competence

INVESTIGATE THE WORLD
- Students investigate the world beyond their immediate environment.

RECOGNIZE PERSPECTIVES
- Students recognize their own and others' perspectives.

COMMUNICATE IDEAS
- Students communicate their ideas effectively with diverse audiences.

TAKE ACTION
- Students translate their ideas into appropriate action to improve conditions.
Critical and reflective practice
- Become a critical and reflective practitioner
- Incorporate self-assessment and critical reflection into teaching development

Peer and self-assessment
- Critically assess teaching strategies
- Incorporate peer-assessment into teaching development

Development of Knowledge
- Explore various pedagogies and teaching strategies
- Develop teaching competencies required for effective and engaging professional TAs

Demonstration of skills
- Outline a teaching lesson
- Demonstrate teaching ability

Foundation Knowledge (“to know”)
- Teaching Skills
- Digital, Research & Cross-disciplinary Literacy

Knowledge of Scholarly Teaching
- Performance/Action
- Engagement/Motivation

Growth in SoTL
- Commitment/Identity

Learning about One’s Teaching
- SoTL Transformation

Humanistic Knowledge (“to value”)
- Ethical/Emotional Awareness
- Diversity Competence

Meta Knowledge (“to act”)
- Creativity & Innovation
- Problem-solving & Critical Thinking
- Communication & Collaboration

https://educateria.com/tag/conceptual-framework/