



# Biology

Department of Biological and Chemical Sciences  
Jefferson College of Life Sciences

# Presentation Overview

- Program Description
- Plan of Study
- Sample Student Work
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- Careers
- Faculty Profile



# Dr. Jeffrey A. Klemens

PROGRAM DIRECTOR, BIOLOGY



[Jeffrey.Klemens@jefferson.edu](mailto:Jeffrey.Klemens@jefferson.edu)




215-951-2825




Jefferson

CREATE WHAT'S NEXT



At TJU we are dedicated to training the 21<sup>st</sup>-century biologist by providing an education rich in active learning and student-driven experiences, and that focuses on the core competencies of our field—from laboratory skills to computational literacy.

We prepare students for a range of specializations by partnering with our colleagues inside and outside of TJU to provide opportunities for research and career development. The biology degree is a perfect match for a student who is interested in the life-sciences but has yet to pick a specific career trajectory. Our students go on to careers in the medical professions, biomedical research, environmental science, and more.



## Biology Core

2 X General biology

Principles of Genetics

Biodiversity

Science Seminar

Medicinal Plants

~and any 5 of~

Microbiology, Anatomy & Physiology, Histology, Immunology, Pathology, Molecular Genetics, Medical Genetics, Bioinformatics, Genetics Seminar, Biochemistry, Ecology, Oceanography, Natural Resource Management, Preventative Medicine, Field Study Costa Rica, Field Study Yellowstone, Independent Research

## Science Core

4 X Chemistry

2 X Physics

2 X Calculus

Biostats

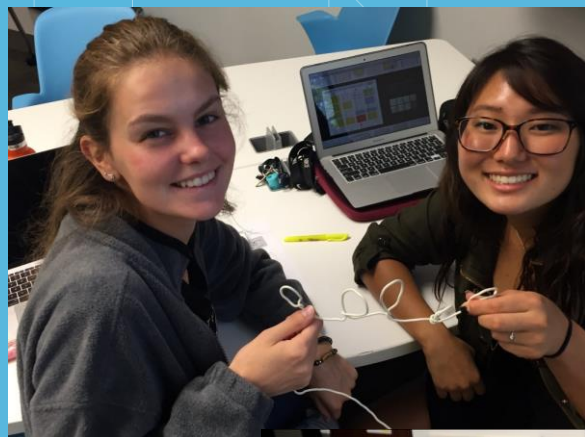
## Hallmarks

Writing

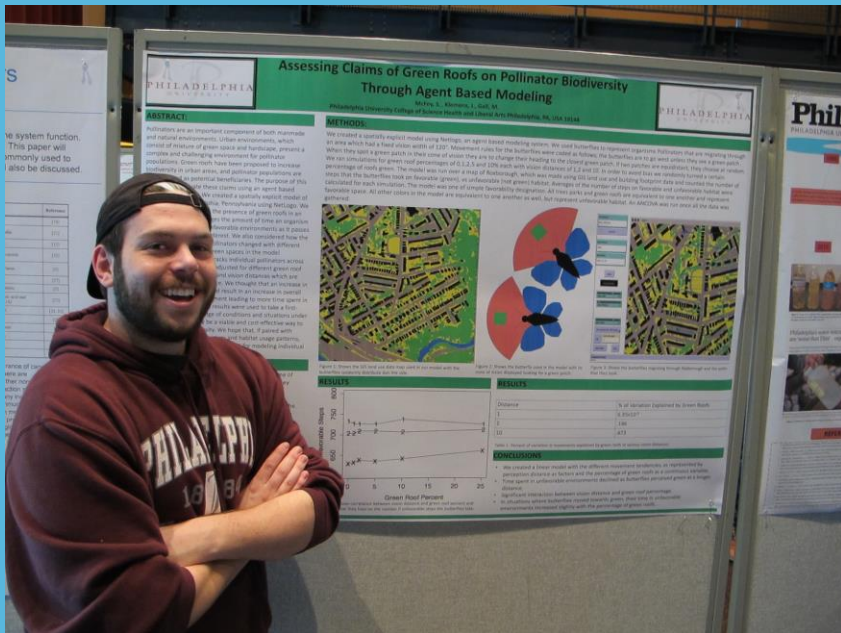
Liberal arts

Creative core

## Class 'Work' in the Biology Program



# Student research presentations at regional conferences





# Irene Cooper

PHILADELPHIA, PA  
CLASS OF 2022

Irene is a biology major who is excited about both basic science research and a career in the medical field. After graduation she hopes to enter an MD/PhD program to pursue these interests.

Irene has served as an undergraduate lab assistant for both biology and chemistry courses, worked as a Residential Assistant in the dorms, and is currently involved in research.

*“The small class sizes allow students to form strong bonds with faculty and peers.”*

She is applying to summer research programs both in Philadelphia and across the country.





## Tyler Savage

Sicklerville, NJ  
CLASS OF 2022

Tyler came to TJU excited about many aspects of biology but unsure exactly what kind of a career he wanted to pursue. He is the founding member of the TJU Biology Society which he hopes will help students in our rapidly expanding program learn more about careers available in the life sciences.

*“I’m grateful for all of the opportunities I have had at Jefferson.”*

Tyler runs cross-country and is involved in numerous research projects on campus. He was recently awarded a Capstone grant by the university to support his senior research project.

Biology students go on to diverse careers. In the last five years, our students have gone on to:

Medical School

Veterinary School

PA School

MS in Bioprocessing

MS in Cytotechnology

Various other MS And PhD  
programs in the life sciences

Hospital Lab Manager

Technical Writer

Law Clerk

Wildlife Rehabilitation Specialist

Bench Scientist, Pharmaceutical  
Industry

Ph.D. Scientist at a Biotechnology  
Device Manufacturer

Government (EPA and PWD)

# Dr. Anne Bower

Professor, Dept. of Biological and Chemical Sciences

BS in Behavioral Biology and Psychology, Beloit College  
 MS University of Florida  
 PhD University of Florida

Dr. Bower has worked in agriculture, forestry, and parks management in Africa and the Caribbean and guides student researchers in exploring the management practices for endangered and invasive species at local parks and wildlife refuges.

## COURSES

- BIOL 208 - BIODIVERSITY
- BIOL 209 - MEDICINAL PLANTS
- BIOL 301 - ECOLOGY
- BIOL 305 - PREVENTATIVE MEDICINE
- BIOL 415 - NATURAL RESOURCE MANAGEMENT



**Jefferson**  
 Natural Dye Potential of Invasive Plant Species for Commercial Textile Applications  
 Irene Cooper, Anantpal Jagra, William Nguyen, Tyler Savage, Madison Bright, Nicholas Wahba, Anne Bower, Rebecca Flux  
 College of Life Sciences, College of Design, Engineering, and Commerce

**ABSTRACT**

Invasive plant species that occur throughout the United States are often highly invasive and difficult to control. The ability of these species to colonize new areas is a result of their ability to colonize new areas. The ability of these species to colonize new areas is a result of their ability to colonize new areas. The ability of these species to colonize new areas is a result of their ability to colonize new areas.

**INTRODUCTION**

- A plant species is considered an invasive species if it spreads outside its native range and causes harm to the environment, economy, or human health.
- Invasive species are those species that are introduced to a new area and spread rapidly, causing harm to the environment, economy, or human health.
- Invasive species are those species that are introduced to a new area and spread rapidly, causing harm to the environment, economy, or human health.

**CONCLUSION**

- Harvesting the roots of the plants potentially reduces their ability to colonize new areas.
- Future studies will examine the dye potential of other invasive species.
- Environmental benefits of invasive removal will be studied by gradually removing plants in the landscape.

**REFERENCES**

1. ...  
 2. ...  
 3. ...

METHODS	RESULTS
<p><b>Harvest &amp; Crude</b></p> <p>Figure 4: Roots were cut into small pieces and dried in a oven. The roots of each plant were cut into small pieces and dried in a oven. The roots of each plant were cut into small pieces and dried in a oven.</p>	<p><b>Dye</b></p> <p>Figure 6: Dye extracted from the roots of each plant was used to dye fabric. The dye extracted from the roots of each plant was used to dye fabric. The dye extracted from the roots of each plant was used to dye fabric.</p>
<p><b>Antimicrobial</b></p> <p>Figure 5: Each root was tested for antimicrobial activity. The roots of each plant were tested for antimicrobial activity. The roots of each plant were tested for antimicrobial activity.</p>	<p><b>Cracking</b></p> <p>Figure 8: The roots of each plant were tested for cracking. The roots of each plant were tested for cracking. The roots of each plant were tested for cracking.</p>
<p><b>Perforation</b></p> <p>Figure 9: The roots of each plant were tested for perforation. The roots of each plant were tested for perforation. The roots of each plant were tested for perforation.</p>	<p><b>Figure 10: Color change of plant species over time.</b></p> <p>Figure 10: Color change of plant species over time. The graph shows the color change of plant species over time. The color change of plant species over time is shown in the graph.</p>
<p><b>Figure 11: Root samples of plant species over time.</b></p> <p>Figure 11: Root samples of plant species over time. The root samples of plant species over time are shown in the figure.</p>	<p><b>Figure 12: Root samples of plant species over time.</b></p> <p>Figure 12: Root samples of plant species over time. The root samples of plant species over time are shown in the figure.</p>



Figure 1: Bright red flowers of Barbary. Figure 2: Bright red flowers of Oriental Bittersweet. Figure 3: Bright red flowers of Whiteberry.

# Dr. Anne Bower

Professor, Dept. of Biological and Chemical Sciences

Dr. Bower enjoys teaching students about the natural world and its relationship to contemporary health and environmental challenges. She is a devotee of active learning approaches in her classes, focusing on hands-on activities, student-driven presentations. She loves working with students in the field or in the lab and maintains an active undergraduate research group. Currently her students are exploring the use of invasive species in applications in the textile industry, particularly as a source of new natural dyes.

*“I love to teach and learn! I see my role as a guide on the side as we discover and explore options for conserving the Earth’s diversity.”*

Before coming to TJU, Dr. Bower worked for the Peace Corps in Sierra Leone and USAID in Jamaica and Botswana. She still enjoys traveling with students, with recent destinations including Costa Rica and Honduras. An upcoming Field Course to Yellowstone National Park is in the works!



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