

EXPERIENTIAL LEARNING IN KIM LANDSBERGEN'S ENVIRONMENTAL SCIENCE CLASSES AT ANTIOCH COLLEGE: USING THE CAMPUS FARM, CAMPUS LANDSCAPE, AND GLEN HELEN FOR TEACHING & RESEARCH FALL 2014 – SPRING 2019

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Class / Title / Activity – from Fall 2014 – Spring 2019

BIO210 Botany – Field botanical surveys (Glen Helen, campus, farm), multiple labs on the Farm and Glen, and botanical dye lab using materials from the Farm.

CHEM220 Environmental Chemistry – Farm soil analysis for lead (Pb) content (found to be well below regulated limits).

ENVS105 Introduction to Environmental Science - Farm tours; Garlic planting group activities when weather permits; Glen Helen Raptor Center visits.

ENVS205/305 Ecology – trips to Glen Helen, using the campus landscape for labs, especially the urban forest and reforestation areas.

ENVS230 Soils: A Living System – multi-week labs focusing on soil chemistry, fertility, structure, land use on campus, the Farm, and the Glen

ENVS319 Hydrology – multiple labs on campus (stormwater) and in Glen (in-stream)

ENVS 335 Field Plant Ecology - multiple plant ecology labs in laboratory, on the campus landscape (natural areas), in Glen, and off-campus

ENVS 339 Ecological Agriculture – weekly Farm labs involving operations, biology, soils, pest control, fertility, permaculture, etc. Spring 2017: Kale fertilization experiment, students testing foliar versus soil-level applications of fertilizer.
Spring 2019: mulch nutrition experiment, using hay versus alfalfa mulch on kale, assessing plant and soil responses

ENVS 339 Ecosystem Ecology – Field trips in Glen Helen, forest biomass plots, assessment of above- and below-ground carbon in honeysuckle-controlled and untreated areas.

GS Food – Spring 2016 - co-taught w/ Emily Steinmetz. Projects concerning Antioch Kitchen, Food Committee, Real Food Challenge, and Farm connections, Asparagus planting group activity.

GS ArtScience – Winter 2017 - co-taught w/ Forest Bright. Used natural materials from campus landscape, and visited greenhouse as part of student class projects.



Applied/Research Projects with Students and Antioch Colleagues Using Farm, Campus Landscape, or Glen Helen Resources:

Title: Historical Ecology of the Antioch College Urban Canopy: From the Deep Past to the Present

Student researcher: Stephanie (Steph) Harman ('19) Fall '18 & Spring '19

SCI 297 and SCI 495 – Independent Research, and Senior Research Project courses

Summary: This project was an historical ecology assessment of the forest canopy development and ecosystem services of Antioch College's campus trees from its founding in the 1850's to present day, using historical records, aerial photography, satellite data, and the US Forest Service program iTree.

Title: i-Tree and Citizen Science: Antioch College Complete Campus Tree Map and Inventory

Student researcher: Kyna Burke ('19) Fall '18 & Spring '19

SCI 297 and SCI 495 – Independent Research, and Senior Research Project courses

Summary: This project produced an inventory of the forest canopy, a map, and ecosystem services assessment of Antioch College's campus trees using silviculture inventory methods and the US Forest Service program iTree.

Title: Antioch College Tree Team

P.I.: Kim Landsbergen. Student assistants: Kyna Burke ('19), Steph Harman ('19),

Ryn McCall ('22), Ben Timmester ('22).

Summary: Working from a master plan map of campus, students coordinated weekly measurements of tree size, species, location, and canopy health.

Grant: SENCER

Title: A Comparative Analysis of Nutritional Content and Color Reflectance in Invasive Versus Native Fleshy Fruits

Student researcher: Steven Taylor ('17) Winter '17 & Spring '17

SCI 494 and 495 – Senior Research Project

Summary: This study compared the optical qualities – the “redness” – of red fleshy fruits from native shrubs versus invasive shrubs found in Yellow Springs, Ohio (including Glen Helen).

Title: Characterization of campus soil carbon storage and water infiltration: A study of soil properties and soil structure.

Grant: Antioch College Faculty Development Fund

SCI297 - Student researcher: Anthea Van Geloven ('17) Summer 2015

SCI297 – Student researcher: Olivia Minella ('17) Spring 2016

Summary: A team of students collaborated on a soil carbon inventory in various areas of campus with varying land use history; examining: the suburban main campus (campus forest restoration area, lawns), also on the Antioch Farm, and the south campus pasture, and the forest soils of Glen Helen (as reference ecosystem).

Title: Xylem (wood) –based water filter for emergency filtration, a project funded by the US-EPA People, Prosperity and Planet (P3) program

co-PI: Jessica D'Ambrosio, co-op faculty;

SCI 297 - Student researcher: Maya Canaztuj ('17) Fall 15 and Winter 16

P3 Team leader- Rian Lawrence ('17) ; LEAF fellow Lanique Dawson ('19)– assistant.

Summary: Increasing water insecurity in the US has led to the demand for low-tech, do-it-yourself

("DIY") emergency water systems. Our team tested, evaluated and optimized a design for a xylem-based water filter system. Species of wood and variations in filter design were tested to optimize flow and water safety. Comparisons of the xylem filter were made to current DIY filter systems, leading to recommendations for use. Wood xylem was collected from campus trees.

Grant: \$15,000 US EPA P3 grant

Title: Wild greens workshop: exploring nutrition, education through hands-on learning

Student researcher: Julia Navaro-Honchel ('16) Winter 16 & Spring 16

SCI 494 and 495 – Senior Research Project

Summary: The objectives of the project were to: collect and analyze nutrition content of some wild edible greens and compare these findings to the literature; to provide an educational workshop to the public focusing on the I.D., use and preparation of edible wild greens; and to assess the educational impact of the workshop. Greens were collected from the campus area.

Title: An investigation of *Pyrus calleryana*: comparing native and invasive leaf decomposition rates under invasive honeysuckle canopies in Glen Helen Nature Preserve

SCI 297 - Student researcher: David Schopmeyer ('16) Winter 16 & Spring 16

SCI 494 and 495 – Senior Research Project

Summary: This research project experimentally tested the impact of honeysuckle presence and removal on leaf decomposition rates in forested areas of the Glen, in order to investigate the interactions of invasive woody plants with the forest carbon cycle.

Title: Comparing Brix and lab-based analyses of nutrition in microgreens

Student researcher: Diana Harvey ('16) Winter 16 & Spring 16

SCI 494 and 495 – Senior Research Project

Summary: This research project aimed to compare results from a commonly used hand-held refractometer (Brix) used in farm applications in the field versus analytical laboratory measurements of leaf nutrition and plant health in plants grown in varying fertilizer levels.

Title: Surveying native bee diversity on Antioch's campus; Summer 2015

SCI 297 - Student researcher: Cherokee Hill-Read ('17), Summer 15

Pollinator biodiversity survey: Main campus, Farm (South Campus Pollinator Path)

Grant: Propolis Project via the Levin Family Foundation

Title: Planning and Launching Phase I: Pollinator Path; Spring 2015

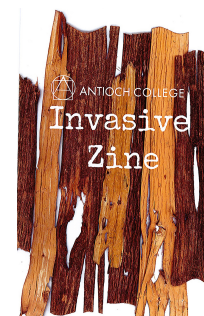
Summary: Purchasing, planting native flowering prairie plants in South Farm pasture
ENVS305/ENVS339 – Ecology and Applied Ecology courses

Grant: Propolis Project via the Levin Family Foundation

Title: INVASIVE Zine at Antioch College, Winter Spring 2015

Summary: Using fibers from harvested invasive honeysuckle from the Glen, Profs. Andy Thompson and Kim Landsbergen hosted workshops to make paper and construct a zine about the impacts of invasive biology. The resulting publication was curated from a national call for entries and was constructed using honeysuckle paper and bark.

Grant: Puffin West Foundation



Applied Research / Service Learning Projects

Spring 2019

EarthWeek at Antioch College (22 April – 26 April)

Coordinating volunteer events: Invasive species weed removal, tree planting

BIO 210 (spring '17) Botany - Tree planting program for Arbor Day

BIO 210 (spring '18) Botany - Tree planting program for Arbor Day

BIO 210 (spring '19) Botany - Tree planting program for Arbor Day

Spring 2019 – BIO210 Botany and ENVS 339 Ecological Agriculture

Service learning and planting flower beds in front of OKL and behind McG

Fall 2018 – Organized a fall landscape bed cleanup with other faculty volunteers on Fall 2018 Community Day, Oct 2nd

Fall 2018 Antioch Tree Team feedback to Campus Facilities

Students' surveys revealed that the large and older sugar maples on campus are in decline; this was brought to staff attention, and the sugar-tapping that Flying Mouse Farms has been doing on campus has been discontinued.

SPR 17 – ENVS339 Ecological Agriculture – Installed “pocket prairie” ecological habitat demo area on main campus – behind Arts & Sciences Building

goals: demonstration of the biodiversity, aesthetics and resilience of this native grass / flowering plant community. Encouraging farming practices that include habitat restoration and biodiversity.

AY 2018-ongoing - Antioch College – Tree Campus USA application

Antioch College is not currently a member of the Tree Campus program, managed by the Arbor Day Foundation. Documenting the campus trees and campus programs will help us create a campus tree plan and register as a Tree Campus.

