

GETTING (AND KEEPING) NORTHERN COLORADO STUDENTS IN THE DOOR: BROADENING PARTICIPATION BY ATTRACTING AND SUPPORTING ALL STUDENTS

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[PI, co-PIs, and Participants in InTeGrate
Implementation at the University of Northern
Colorado, 2015-16]

[https://serc.carleton.edu/integrate/programs/
implementation/northerncolorado/index.html](https://serc.carleton.edu/integrate/programs/implementation/northerncolorado/index.html)

InTeGrate

*Interdisciplinary Teaching of Geoscience
for a Sustainable Future*





Design Goals*

- Address one or more geoscience-related grand challenges facing society
- Develop student ability to address interdisciplinary problems
- Improve student understanding of the nature and methods of geoscience and developing geoscientific habits of mind
- Make use of authentic and credible geoscience data to learn central concepts in the context of geoscience methods of inquiry
- Develop systems thinking

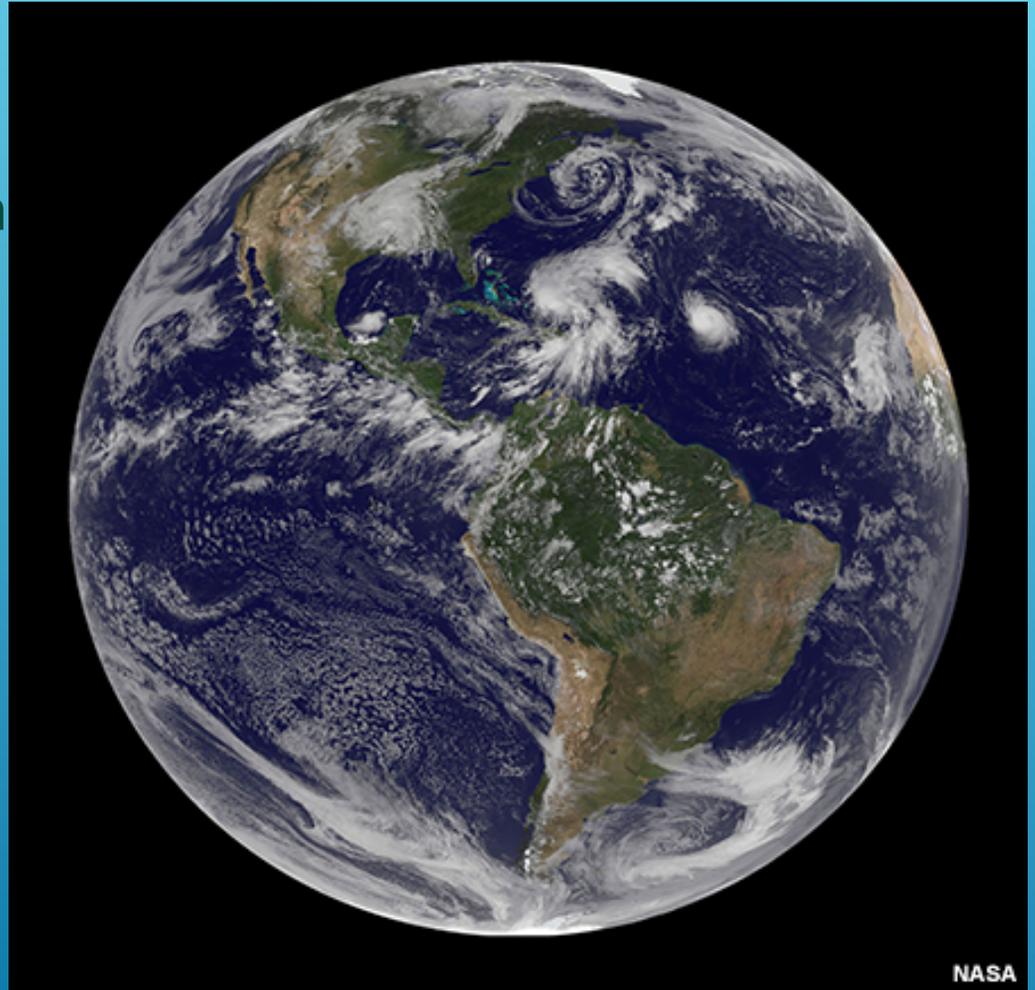
* Referred to as Guiding Principles for Curriculum Design

TO IMPLEMENT THESE DESIGN GOALS EFFECTIVELY, IT IS PROBABLY NECESSARY AND CERTAINLY DESIRABLE TO ENGAGE UNDERREPRESENTED GROUPS OF STUDENT LEARNERS MUCH MORE THAN WE DO NOW. *THE QUESTION IS HOW TO DO SO!*

HOW Do We Broaden Participation? “INVITING DIVERSE STUDENTS TO SUSTAIN THEIR FUTURE”

Geoscience work and training in the U.S. is overwhelmingly (!!) done by whites. That starts with schooling....

Do you think that Underrepresented Groups AND Many Different Cultures Can Help Humans Figure out Sustainability?



RECRUIT MORE STUDENTS AND MORE DIVERSE STUDENTS FROM:

AREA HIGH SCHOOLS

COMMUNITY COLLEGES-TRANSFERS

SUMMER FIELD TRIP EXPERIENCES IN COLORADO

\$\$ SUPPORT TO DO THIS FROM OFFICE OF ADMISSIONS, DEAN'S OFFICE, SPONSORED PROGRAMS, DEPARTMENT FOUNDATION ACCOUNT, AND GRANT FUNDS.

Goal: Double the Number of Admitted Students in Earth Science Majors from 2014 to 2016.

Results: Faculty interacted with 918 students in one academic year and student admits went from 30 in 2014 to 60 in 2016.

University of Northern Colorado Department of Earth and Atmospheric Sciences





BARGE CREW ON CARTER LAKE

Having fun while learning on the water was a new experience for most students. In all of our trips and faculty visits to schools we emphasized applied aspects of the science we do, and how real careers in our local area employ our students because of the training and experience they have.

Who we are!





DEBRIS FLOW FROM 2013 SEPTEMBER FLOODS IN COLORADO

Rocky Mountain Association of Geologists (RMAG) “On the Rocks” field trip for geologists and students, led by Bill Hoyt and Bob Jarrett.

BUT, JUST **GETTING**
STUDENTS IN THE DOOR
ISN'T ENOUGH- **KEEPING**
THEM THROUGH TO
GRADUATION IS THE
REAL GOAL!

STRATEGIES TO DO THAT:

1) DESIGN AND DELIVER FACULTY ADVISING WORKSHOPS TO RETAIN STUDENTS FROM UNDERREPRESENTED GROUPS.

2) USE NEW COURSES AND IMPLEMENT SUSTAINABILITY THEMES INTO INTRODUCTORY LEVEL ENVIRONMENTAL LAB COURSE AND SCIENTIFIC WRITING COURSE.

3) ENRICH 5 UPPER DIVISION COURSES WITH SUSTAINABILITY LABS THAT FOCUS ON SOCIETAL RELEVANCE.

- 1) **ADVISING WORKSHOPS FOR FACULTY TO LEARN AND PRACTICE HOW TO INTERACT, RELATE TO, AND UNDERSTAND STUDENTS FROM UNDERREPRESENTED GROUPS.** →*Dr. Lucinda Shellito and Dr. Julie Sexton.* Attended by our faculty, other STEM faculty, and the Dean of our college.
- 2) **NEW ENVIRONMENTAL SCIENCE LAB COURSE FOR MAJORS AND GENERAL EDUCATION STUDENTS.** →*Dr. Steve Anderson.* Course first offered in 2016, and a section in Ecuador in 2017. **ADD SUSTAINABILITY THEME TO SCIENTIFIC WRITING COURSE.** →*Byron Straw.* Students select a sustainability theme for a paper and poster presentation in a public forum that investigates sustainability issues in their planned career field.
- 3) **UPPER DIVISION COURSES IMPLEMENTING SUSTAINABILITY LABS.** →*Dr. Graham Baird, Ore Geology “The Elements and Society”, Dr. Joe Elkins, Geomorphology “The Role of Modern Human Land Use on Geomorphology, Dr. William Hoyt, Physical and Chemical Oceanography “Sustainability of Ocean Resources Research Project: Law of the Sea”, and Geological and Biological Oceanography “Carbon Through Time: Legacy of Energy vs. Environment”, Dr. Lucinda Shellito, Paleoclimatology “Is Warming Natural or Anthropogenic?”*

UNC INSTITUTIONAL LEARNING OUTCOMES-ILO

ILOs DESCRIBE WHAT ALL GRADUATES OF AN INSTITUTION SHOULD KNOW OR BE ABLE TO DO BY THE TIME THEY GRADUATE.

For General Education (Liberal Arts Core), UNC's first draft has two examples of ILOs, one of which is almost verbatim the two major themes of InTeGrate:

- 1) SUSTAINABILITY OF EARTH SYSTEMS
- 2) RELEVANCE OF ENVIRONMENTAL CONCERNS IN CURRENT ECONOMY AND FUTURE CAREERS.

**SO COOL.....THAT WE ARE MAKING
A DIFFERENCE!**

**I leave you with a new twist on the three Rs:
RECRUIT, RETAIN AND REINVIGORATE!**