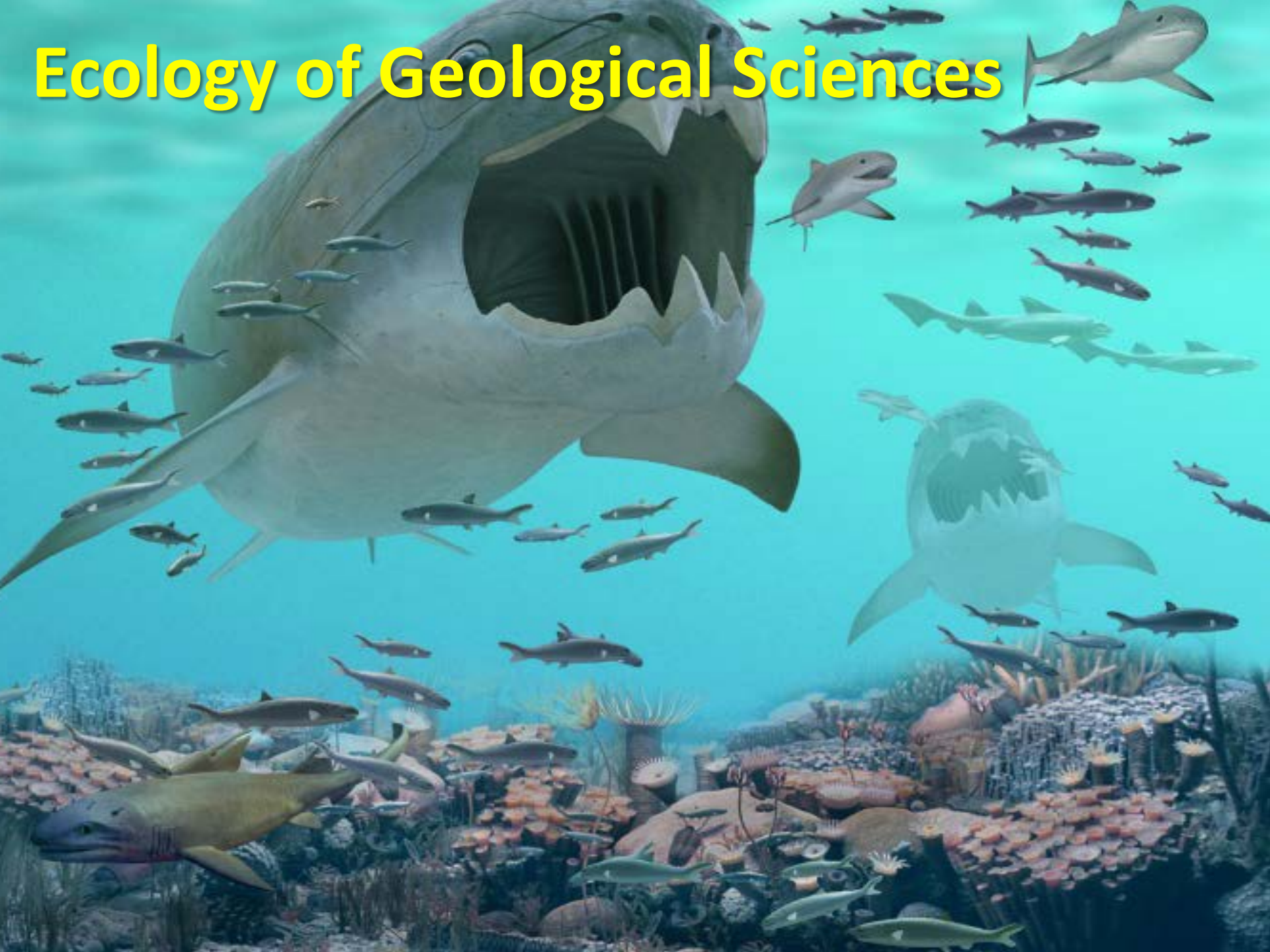


Ecology of Geological Sciences



Composition

Faculty – 36

- 36% F; 64% M
- ½ just A&S, ½ in Institute also)
- 19 full professors
- 8 associate professors
- 8 assistant professors
- 2 instructors & 1 lecturer
- **10 added in last 4 years**
- **1 retiring in 49 days**
- **1 starting in August 2019**
plus
- **1 new endowed chair to be filled '19-'20**
- **2 ongoing searches that could be in GEOL**
- **1 pending request to transfer to GEOL**

Grad Students

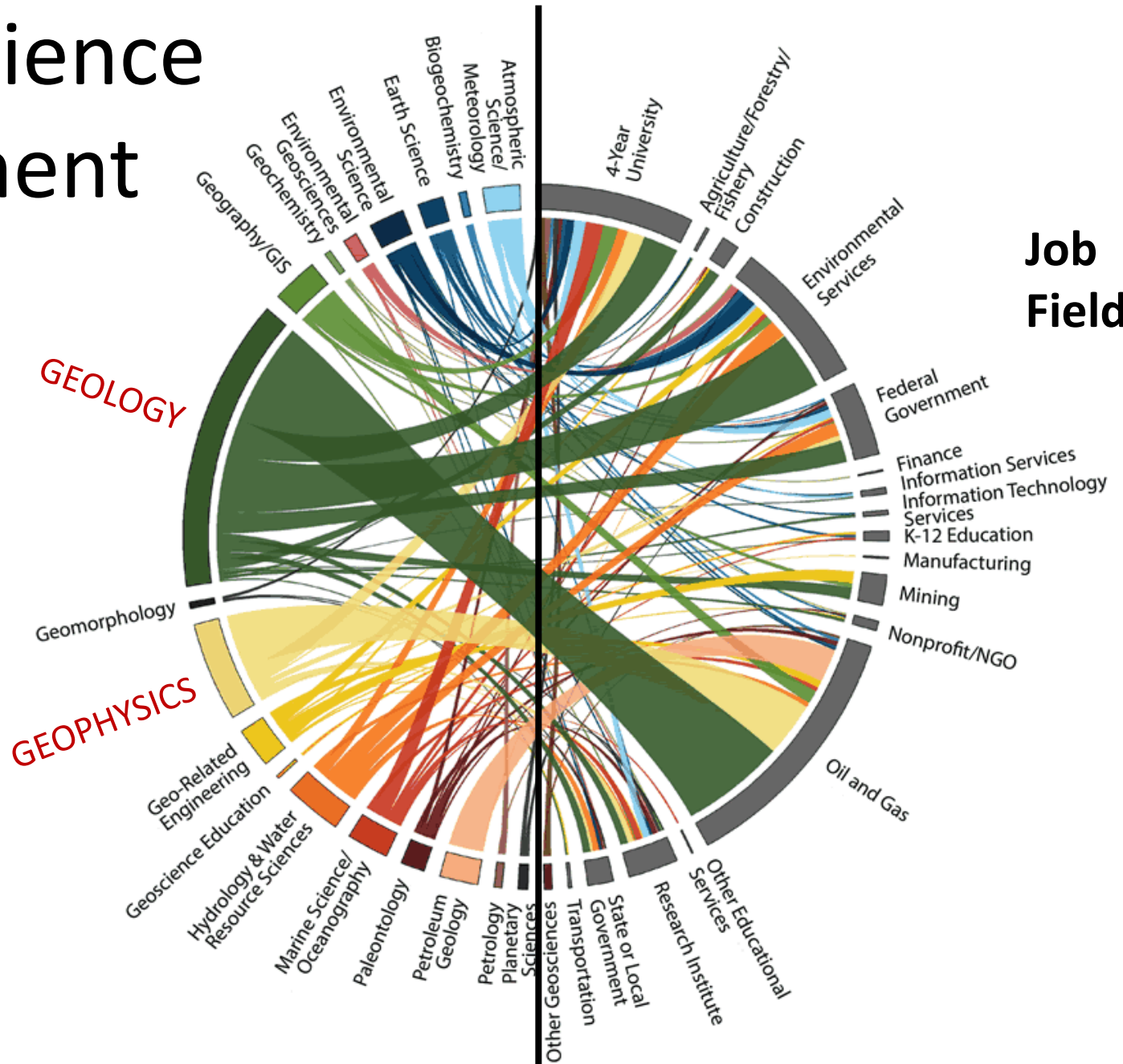
- 68 (18 MS, 2.3 yrs TTD / 50 PhD, 4.7 yrs TTD) – 18, 50% equiv. TAs
 - 54% F[↑]; 16% International; 12% under rep[↑]; 13% enter as residents
 - High GRE scores[↑] (e.g., verbal is 7 of 41 units)

Undergrads (2018-2019 ARP)

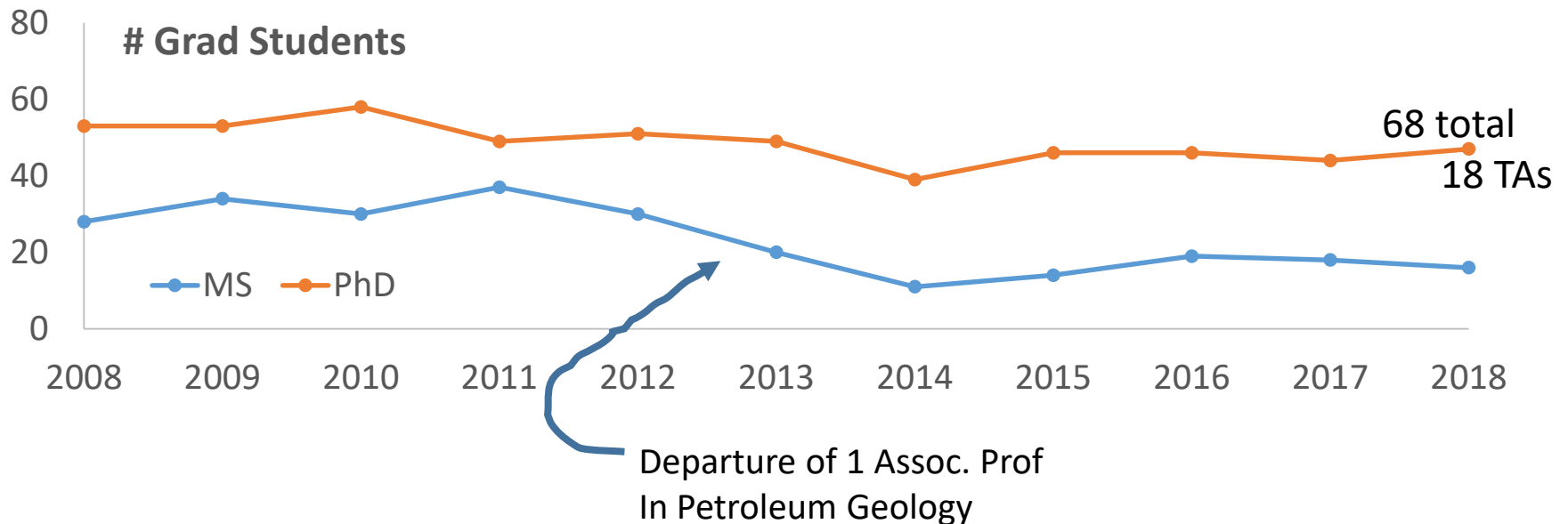
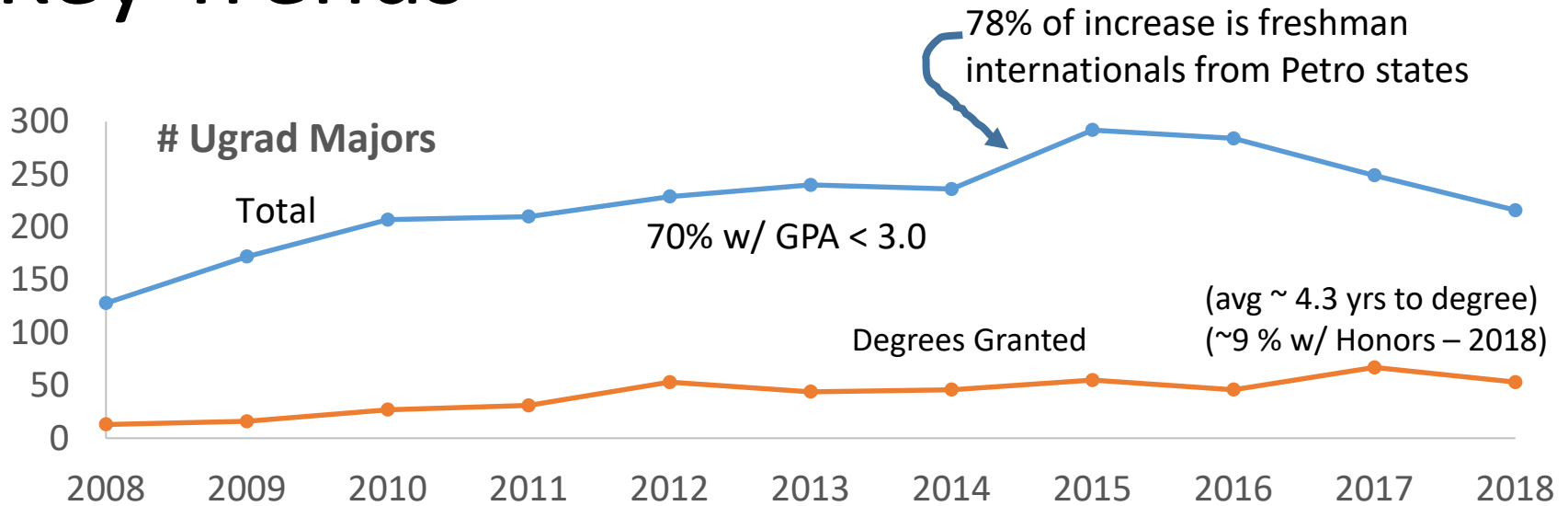
- Majors – 249
 - 51% residents[–]; 31% female[↓]; 19% international[↑]; 13% under rep[↓]
 - ~25% aspires to grad school; 60% to jobs in the field
- Minors - 46

1st Geoscience Employment

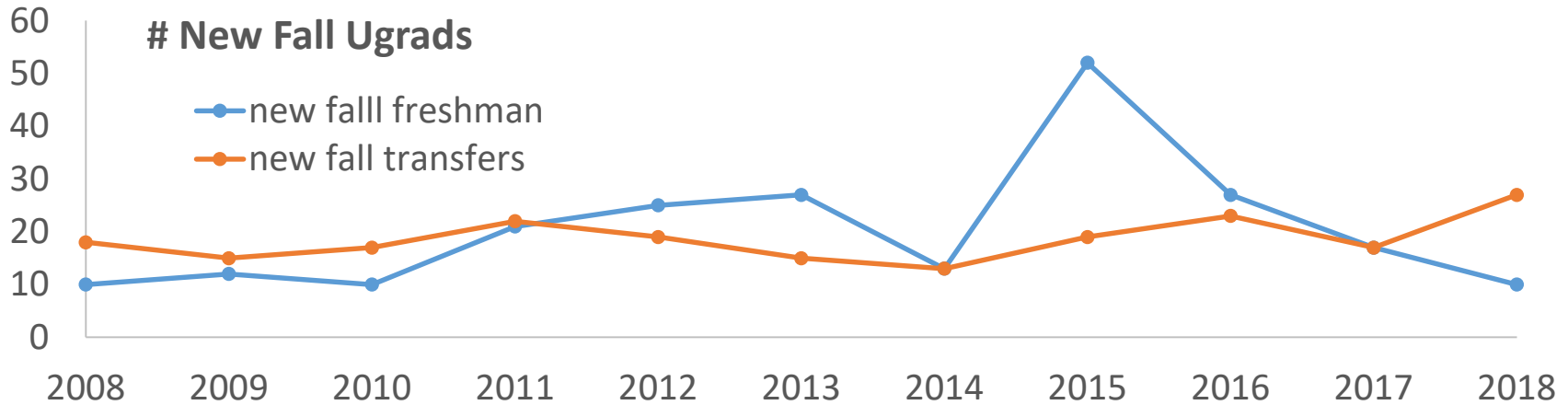
Educational Focus



Key Trends



Key Trends



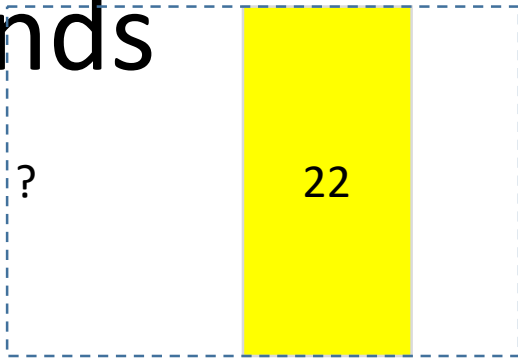
| | FR | SO | JR | SR | SR5 |
|-----------|----|-----|-----|-----|-----|
| GEOL 2001 | 9% | 32% | 33% | 17% | 8% |
| GEOL 2005 | 7% | 36% | 36% | 17% | 4% |

> 50% of majors in 2000-level trunk courses are Jr, Sr, or Sr5

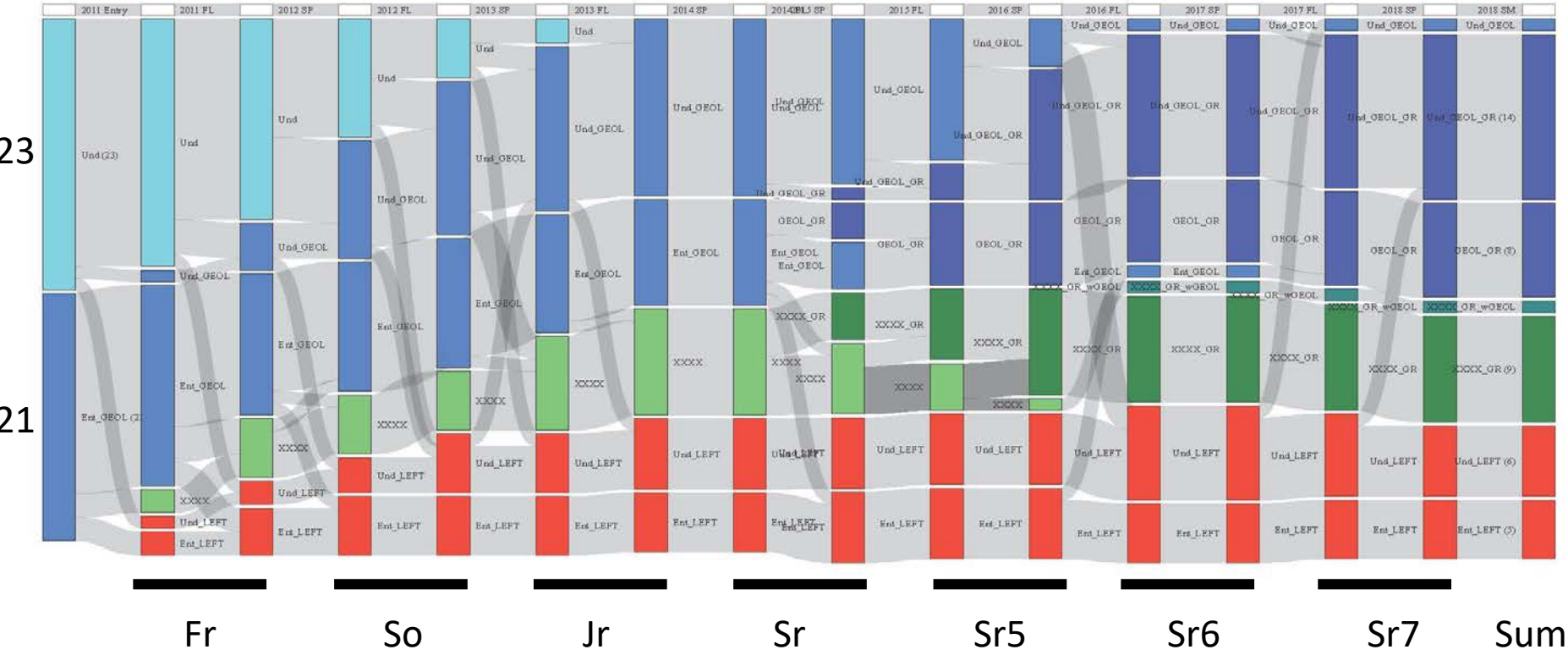
A significant % of our majors are transfers who come “late” to the degree

Key Trends

A significant % of our majors (~30%#) are also external in-transfers to CU, and untracked by these diagrams



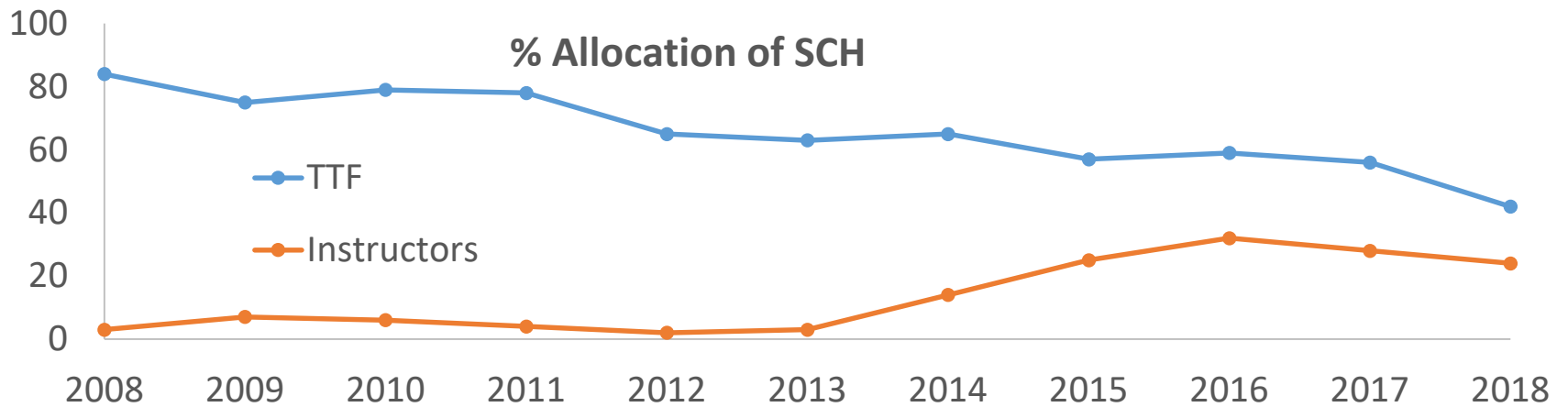
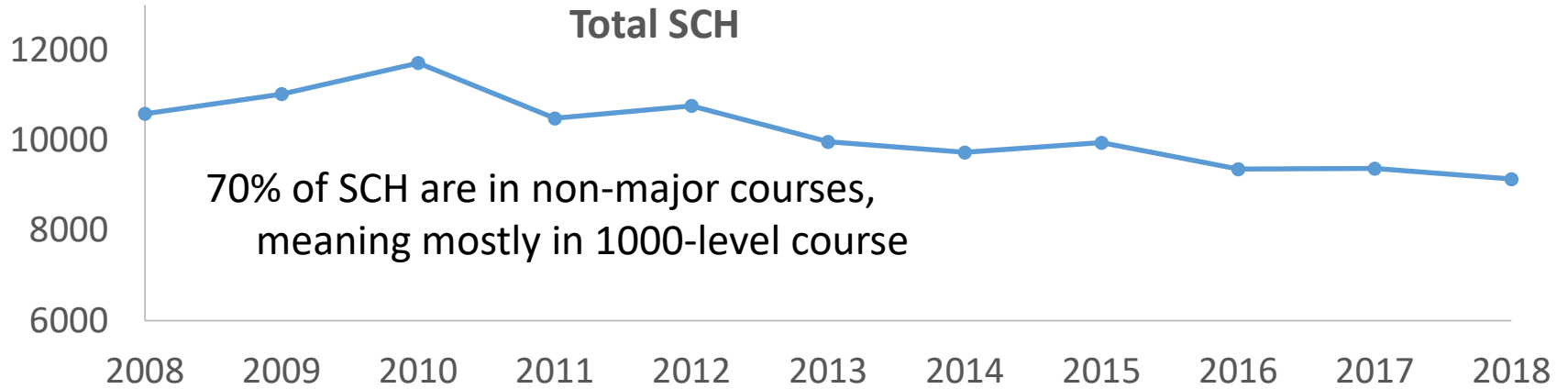
Fall 2011



Source of Majors - 2010-2014:
36% freshmen, 34% CU transfers; 30% external in-transfers

Key Trends

Declining total SCH and increasing # of SCH taught by instructors were perceived as potential problems. So with the arrival of a new A&S “core”, we choose to revamp the 1000-level offerings



Curriculum – General Ed Courses

Retitled 1010 and 1020 and added 1012, 1150, 1170 and 1180 to increase diversity of topics and to engage more faculty in teaching at this level within their narrower foci. 1150 has a recitation – first time we have tried that in GEOL ever.



GEOL 1010
Exploring Earth



GEOL 1012 Exploring
Earth for Scientists



GEOL 1020 History
of a Habitable Planet



GEOL 1170
Our Deadly Planet



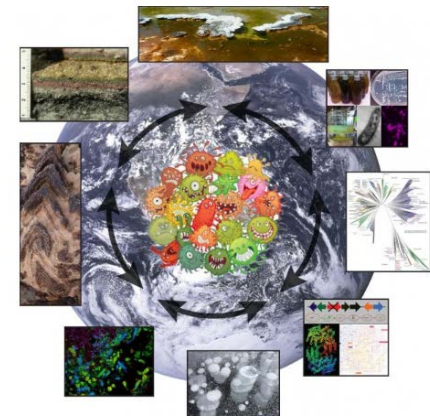
GEOL 1040
Geology of Colorado



GEOL 1060 Global Change
Earth Science Perspective



GEOL 1150 Water
Energy & Environment
2 lectures, 1 recitation



GEOL 1180
Our Microbial Planet

Curriculum – General Ed Courses

- None have an associated lab
- Only 1150 has an assigned TA (all others can ask for hourly graders)
- No unit LG's associated with any – Instructor does what they want
- Homework & active engagement highly variable



GEOL 1010
Exploring Earth



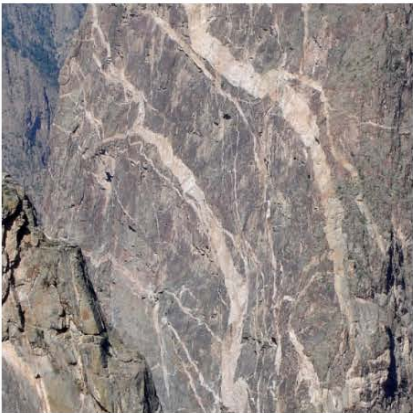
GEOL 1012 Exploring
Earth for Scientists



GEOL 1020 History
of a Habitable Planet



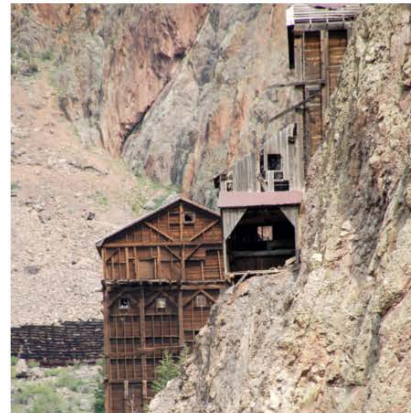
GEOL 1170
Our Deadly Planet



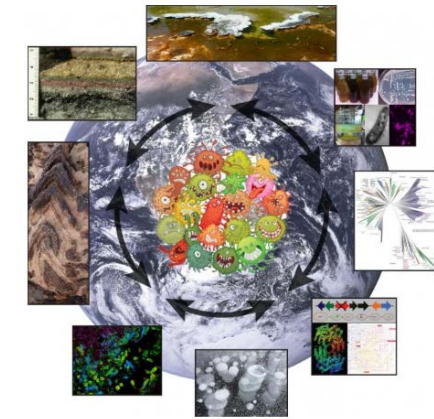
GEOL 1040
Geology of Colorado



GEOL 1060 Global Change
Earth Science Perspective



GEOL 1150 Water
Energy & Environment
2 lectures, 1 recitation



GEOL 1180
Our Microbial Planet

Major Track

Geology Option

- 1 from solid earth
- 1 from surface processes
- 1 quantitative
- 2, 2-credit UD field courses
- Electives so total UD = 27

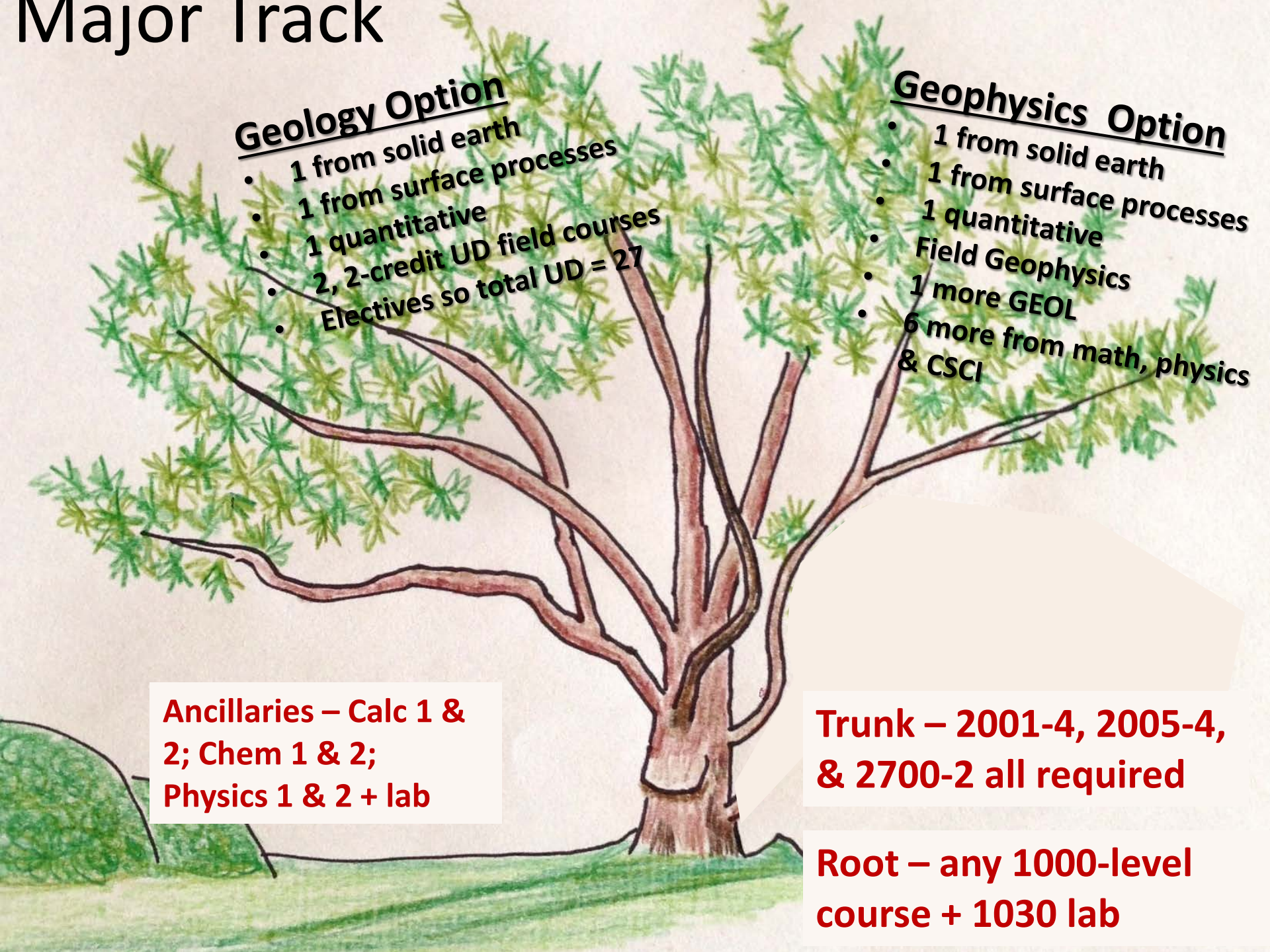
Geophysics Option

- 1 from solid earth
- 1 from surface processes
- 1 quantitative
- Field Geophysics
- 1 more GEOL
- 6 more from math, physics & CSCI

Ancillaries – Calc 1 & 2; Chem 1 & 2; Physics 1 & 2 + lab

Trunk – 2001-4, 2005-4, & 2700-2 all required

Root – any 1000-level course + 1030 lab



Field Courses

– a critical part of the curriculum and at the requirement of two at the 4000-level serve as capstones. But this is a potential bottleneck towards timely degree completion



Transformation Efforts

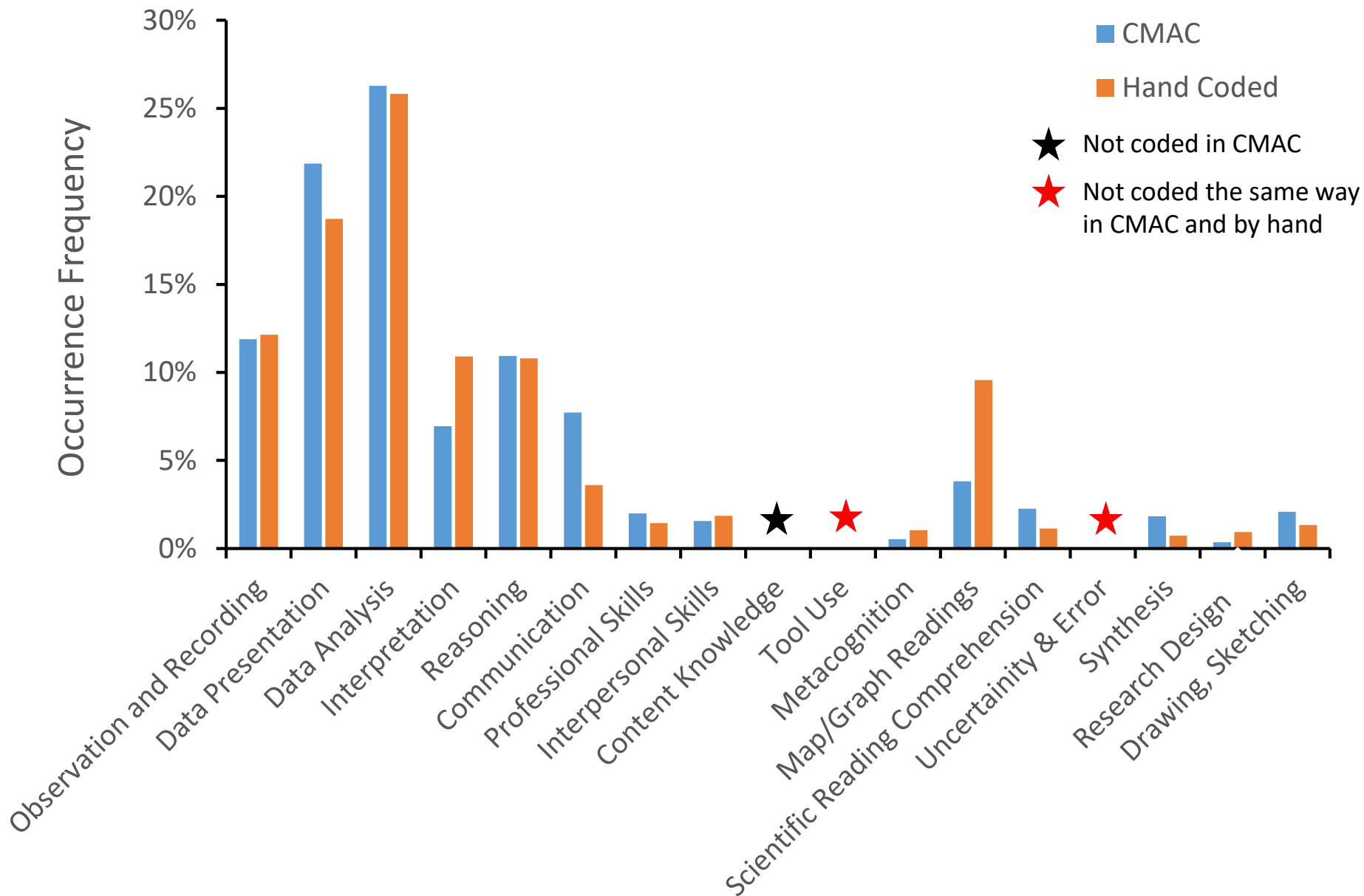
Geological Sciences Curriculum Assessment

- evaluate the alignment of our aspirations for developing skills (e.g., problem solving, critical thinking, communication, etc.) in our major track course
- with what we are actually doing in those courses.

2017-2019 Goals

- Determine the skills we are emphasizing in our major-track curriculum
- Develop and test an assessment tool for measuring the efficacy of our curriculum in developing those skills
 - Pre-instruction assessment on entering 2000-level courses
 - Post-instruction assessment prior to graduation

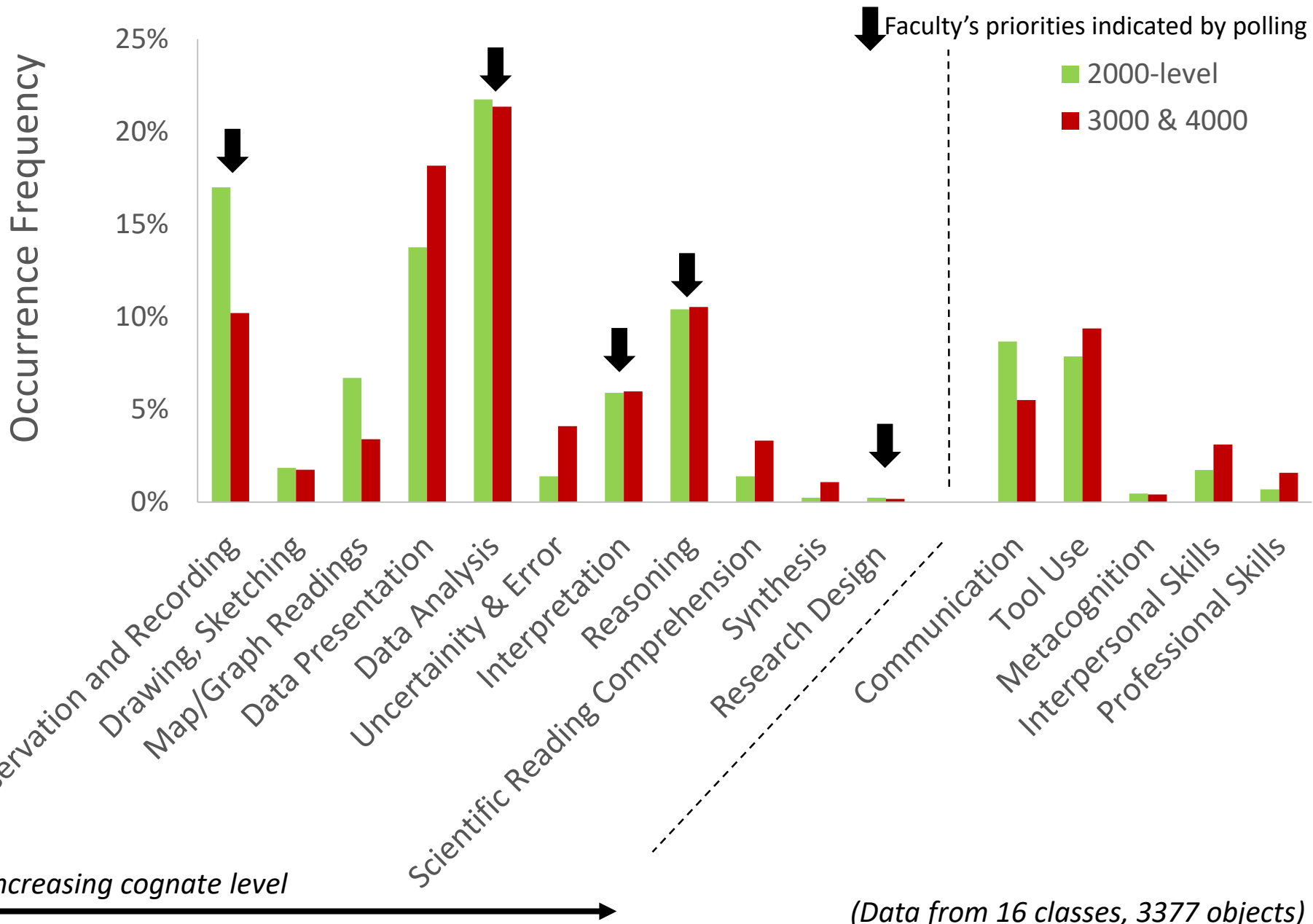
Hand coded vs. Automated CMAC Document Reading

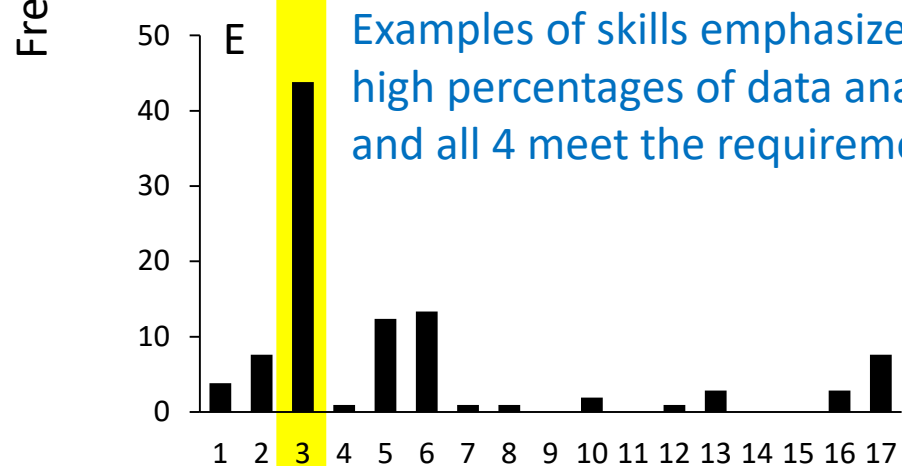
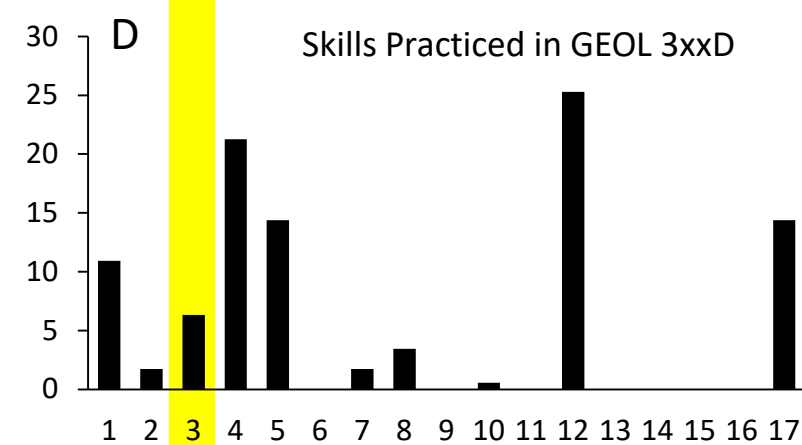
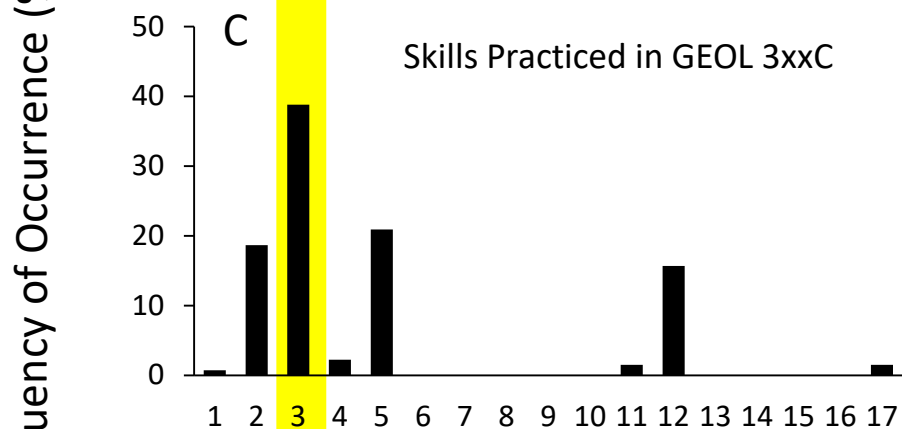
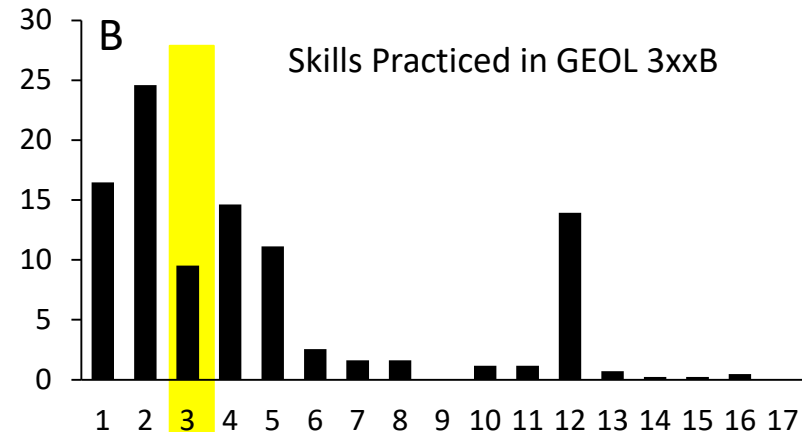
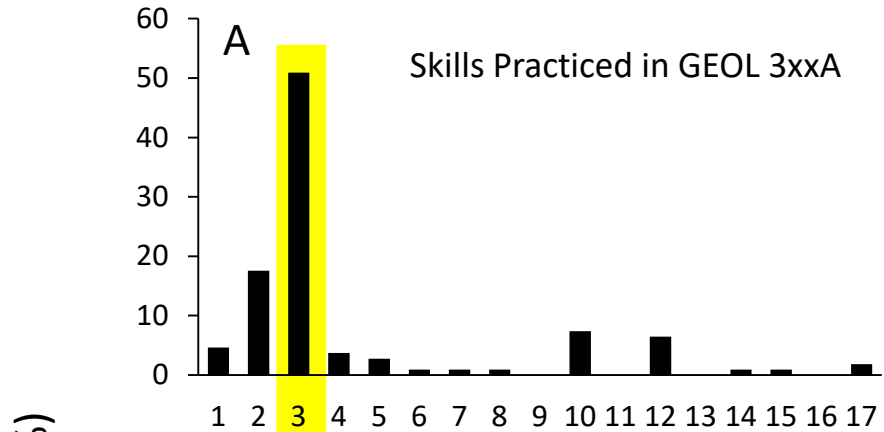


17 Skills Identified (faculty's top 5 in bold)

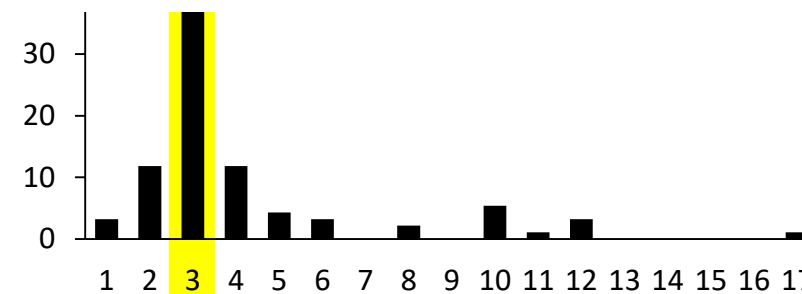
- 1. Observation & recording** – *make qualitative or quantitative observations*
2. Data presentation – *use raw data to make graphs, plots, maps, etc.*
- 3. Data analysis** – *analyze any type of data*
- 4. Interpretation** – *interpret or draw inference from results of data analysis*
- 5. Reasoning** – *provide reasoning for a claim*
6. Communication – *oral presentations and written reports*
7. Professional skills
8. Interpersonal Skills – *collaboration, leadership*
9. Specific content knowledge – *recall specific geoscience information*
10. Tool use – *software, field or lab equipment, library resources*
11. Metacognitive skills – *self-reflection on one's learning*
12. Map, graph, etc. reading – *derive meaning from visuals*
13. Scientific reading comprehension
14. Work with uncertainty and/or error analysis
15. Synthesis – *use multiple types of information to make something new*
- 16. Research design** – *pose questions, generate hypotheses, develop tests*
17. Drawing / sketching – *draw/sketch a picture, concept, model, diagram, etc.*

CMAC Results – What Skills Are We Emphasizing





Examples of skills emphasized in 6 different courses. A, C, E, and F have high percentages of data analysis (which includes quantitative analysis) and all 4 meet the requirement of the “quantitative” course requirement.



Skill

Current Effort

- Institute an assessment plan that will measure the effectiveness of skills instruction and students' skill development as they progress through the major. Possible approaches to include:

- a. In-course exercises designed to track skills through specific courses*
- b. Evaluation of capstone courses and products.*
- c. Exit surveys and/or interviews, offered every year.*

- d. A specially designed assessment tool to be administered in a specific set of majors courses every year.
 - a. Focus on top 5 skills, plus “map and/or graph reading”
 - b. Draw on existing validated instruments for design elements and approaches to scoring
 - c. But not seeking to insure anything more than reliability