



# **Local Research Projects Foster Student Learning in a Growing Undergraduate Department**

Earth and Oceanographic Science  
Bowdoin College  
Brunswick, Maine

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# Local research projects foster student learning

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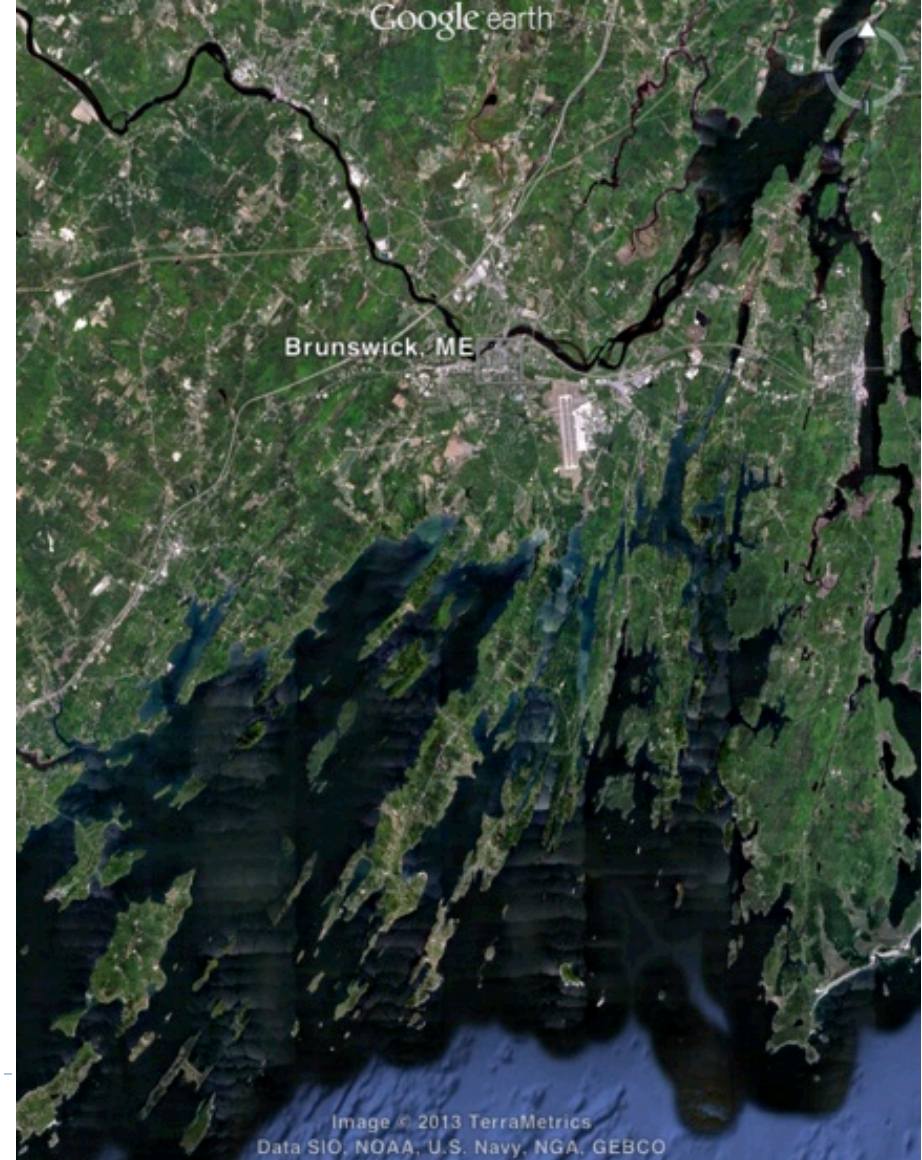
- ▶ Connecting students with place
- ▶ New curriculum for majors
- ▶ Examples
  - ▶ Research projects in introductory courses
  - ▶ Real-time data
  - ▶ Student research during the semester and summer
  - ▶ Departmental field seminars
- ▶ Results
  - ▶ 4-fold increase in # of majors
  - ▶ Students skilled in observational & analytical techniques
  - ▶ Students familiar with how earth's systems operate in local area

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▶ *Students collecting sample during profile of Somes Sound. Departmental Field Seminar 2011.*



# Connecting students with place



# Connecting Students with Place: a new curriculum

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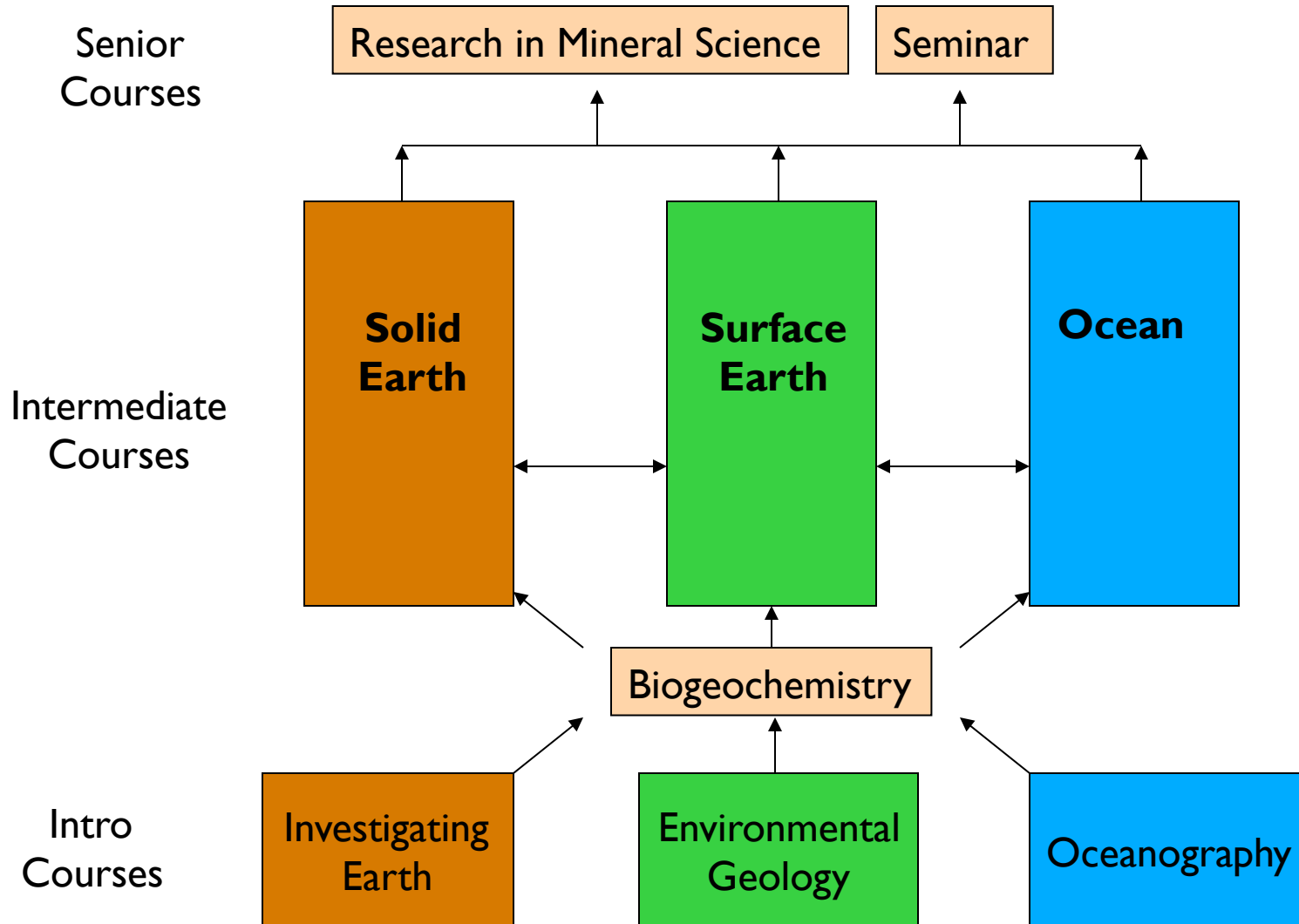
- ▶ Capitalizes on college's coastal Maine location
- ▶ In line with college's mission:  
“To count nature a familiar acquaintance” \*
- ▶ Supported by administration
- ▶ Emphasizes student research
- ▶ Helps students learn how earth's systems operate



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▶ \* Selection from "Offer of the College" by William DeWitt Hyde, President of Bowdoin College 1885 – 1917.

# New Curriculum

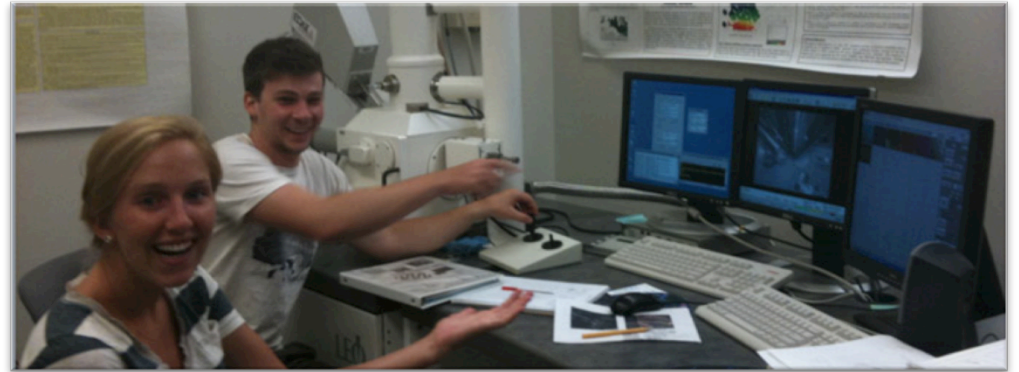
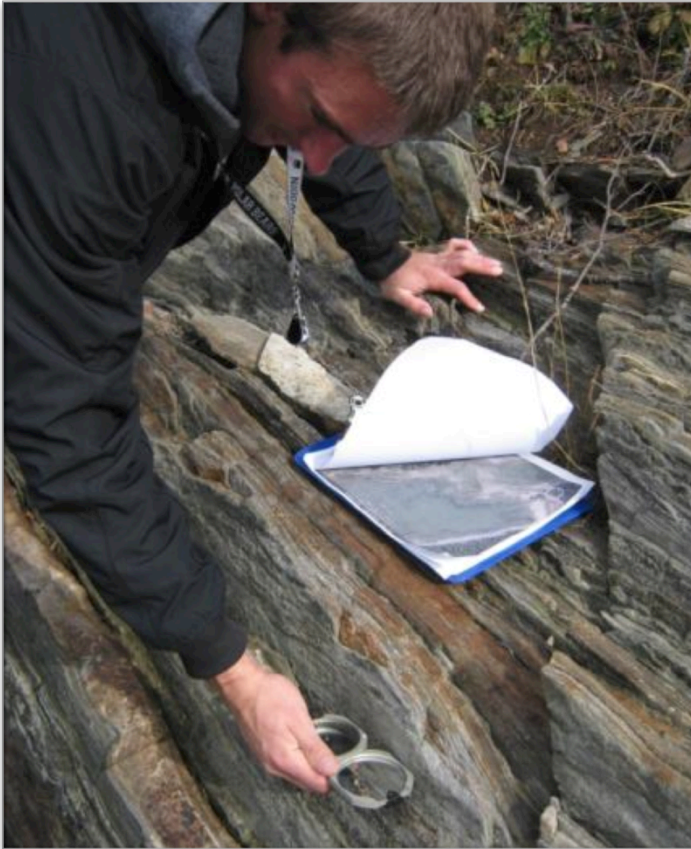


► Approved in 2010; 2014 class is first to graduate under new requirements.



# Examples

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Small group petrology and structural geology research projects in field and lab.

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- ▶ Investigating Earth – introductory course

# Examples



Service-learning projects using real-time water-quality, lake profiling, and stream-flow data.

- ▶ Environmental geology and hydrology – introductory course

# Examples

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Students use MatLab to visualize data they collect from ships in local coastal waters.

Students conduct research using data obtained from the college's real-time oceanographic mooring.





# Examples

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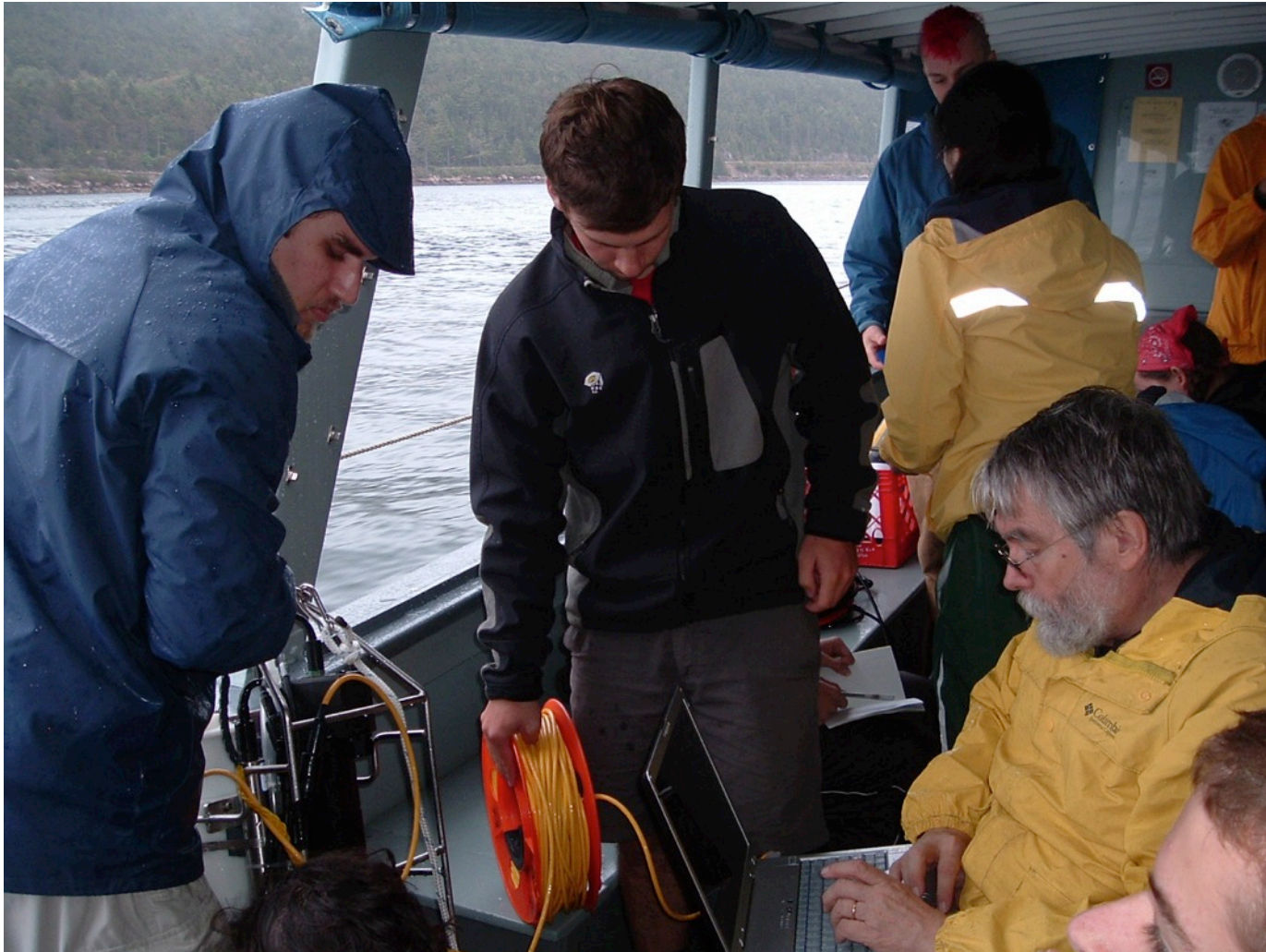
Students design, propose, implement and present their own projects by applying analytical techniques introduced in the course.

For example, using nutrient spectrophotometry to analyze local soil or water samples.

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- ▶ Biogeochemistry – required 200 level course

# Examples: department field seminars

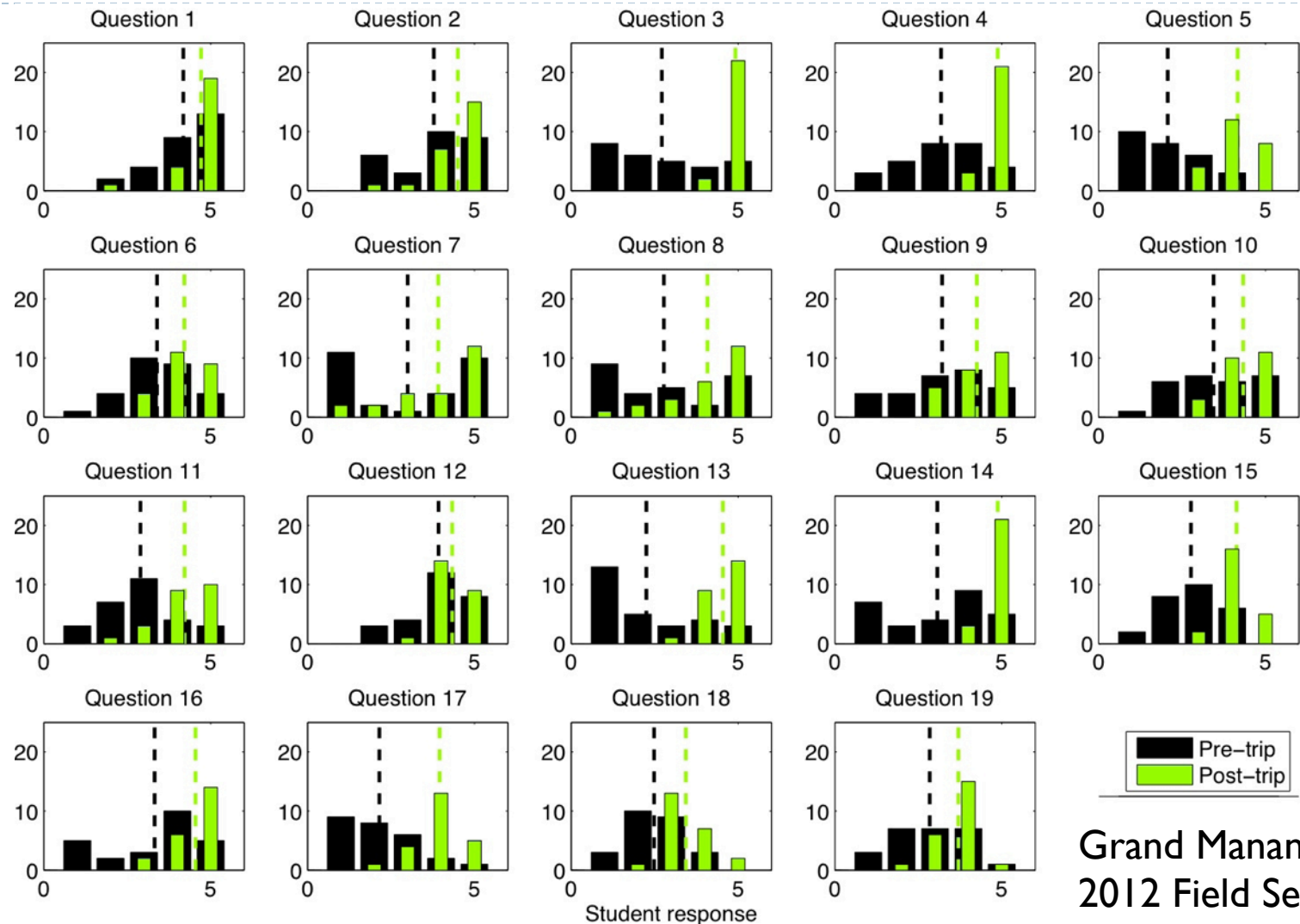
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► Launching the CTD: Somes Sound profile 2011.

# Results: Pre- & Post- Field Seminar Survey



► Knowledge survey: 1 = I have no idea; 3 = I think I know this; 5 = I'm certain of this answer



# Results: increase in number of faculty

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Rachel Beane



Phil Camill



Michèle LaVigne



Emily Peterman



Peter Lea



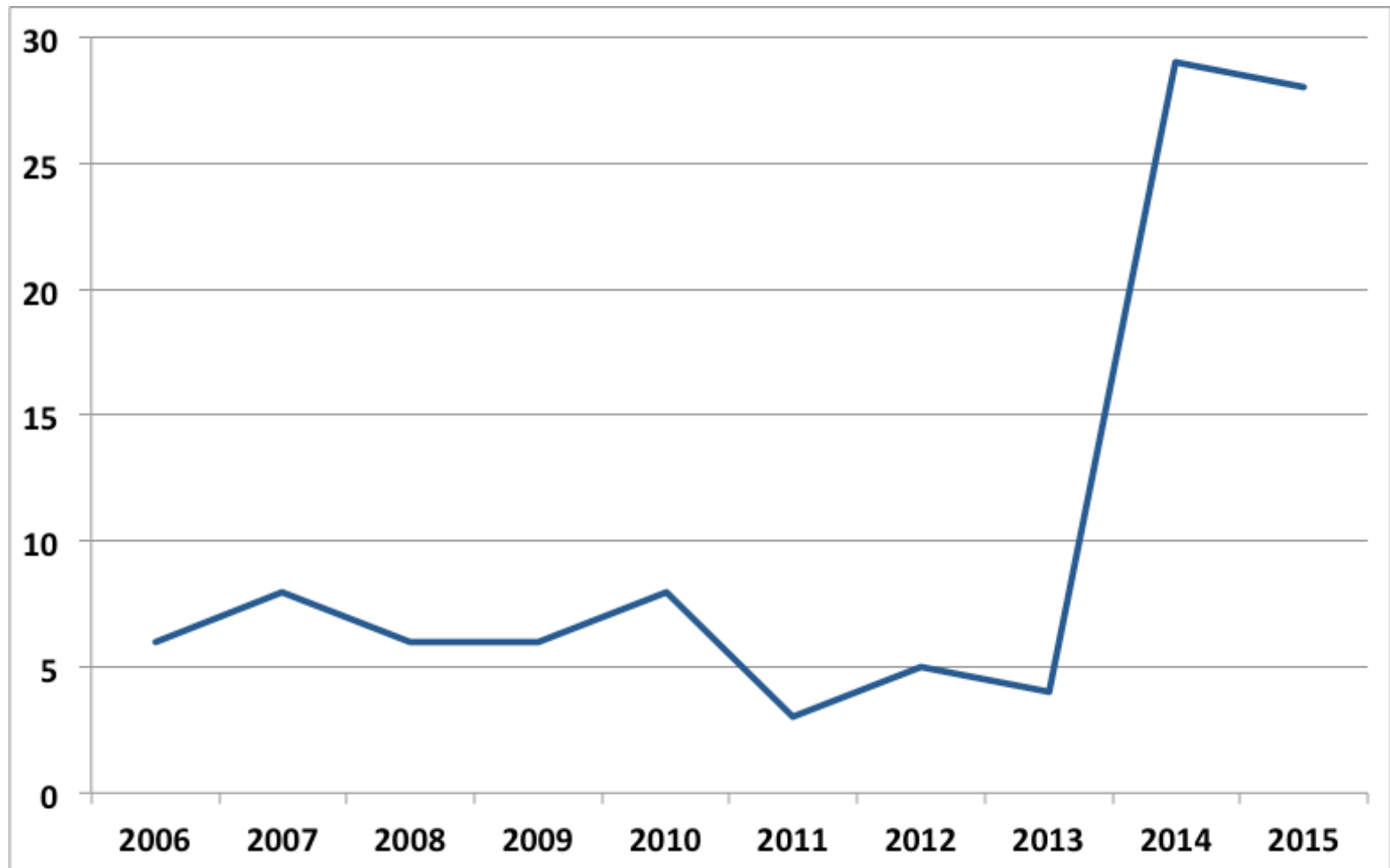
Collin Roesler

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# Results: large increase in number of majors

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► 2010: New curriculum approved.      2014: First class graduating under new curriculum.

# Results: Students are...

- excited to do science.
- asking questions.
- making observations.
- testing hypotheses.
- conducting analyses.
- making interpretations.
- working together.
- learning about the region.



▶ *Grand Manan 2012 Departmental Field Seminar. Students filtering water for total suspended solids and chlorophyll analyses.*



# Acknowledgements to:

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- Bowdoin College
- NSF
- NASA
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- Maine Campus Compact
- Maine DEP
- Northeast Educational Services
- On the Cutting Edge
- Bates College
- Colby College
- University of Maine