

1. Who we are: Earth and Planetary Sciences

We are a small department

22 professors, ~8 PhD researchers/instructors; we teach >35 courses
6 staff members (including 1 IT Specialist, 1 Museum Director)
30 majors, 20 minors, ~30 graduate students (MS, PhD)

Department Chair: Prof. Greg Mountain, gmtn@eps.rutgers.edu

Associate Chair: Prof. Ying Fan Reinfelder, yingfan@eps.rutgers.edu

Graduate Director: Prof. Ken Miller, kgm@eps.rutgers.edu

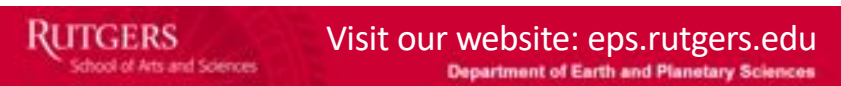
Undergraduate Director: Prof. Roy Schlichte, schlichte@eps.rutgers.edu

Hello! Thanks for visiting. Earth & Planetary Sciences is a department in the School of Arts & Sciences. You can find most of us in Wright Labs on Busch Campus, but the Geology Museum on Old Queens also is a part of EPS.

Unlike other science depts in SAS, EPS is a small department, with ~30 majors and 20 minors, so we are close knit family where everyone knows everyone else.

Feel free to contact any members of department leadership, but most important to you is the Undergrad Director: Prof Roy Schlichte, who will be your main advisor in navigating the courses / requirements, senior research, etc.

You can find out a lot more from our webpage. The featured story is of Prof. Wright and students on research cruise.



Department of Earth and Planetary Sciences



The Department of Earth and Planetary Sciences at Rutgers University on the New Brunswick/Plainsboro Campus is a community of students, faculty members, and research scientists engaged in the exploration of a wide variety of geological problems on Earth and other solar system bodies. We offer both challenging and comprehensive instruction, and students are encouraged to become full members of the research community. Interdisciplinary studies are fostered through the Rutgers Institute of Earth, Ocean, and Atmospheric Sciences. Several faculty hold joint appointments in Anthropology, Environmental Sciences, and Marine & Coastal Sciences. A weekly *Geology Colloquium* brings a diversity of Earth Scientists to our Department to discuss the latest research results and new techniques. Our museum exhibits local geology and engages the public with outreach. Left, undergraduate enjoying an outing in NYC.

Research Units

Publications

Undergraduate

Graduate

Upcoming Events

Publication



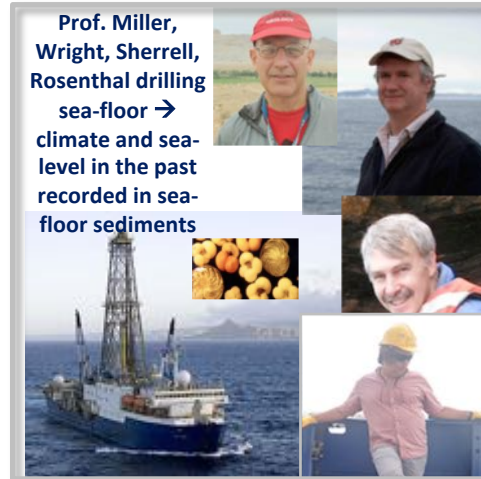
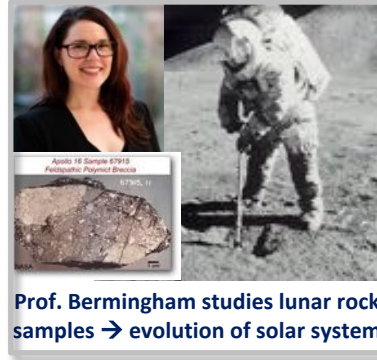
Wright Labs, Busch



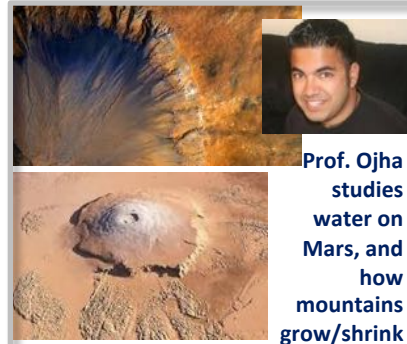
Geology Museum, College Avenue

1. Who we are: Earth and Planetary Sciences

Examples of our world-class faculty



Despite being small, we have a world-class faculty, with 3 National Academy of Sciences members. Here are a few examples, showing Prof. Gross searching for meteorites in Antarctica, Prof. Bermingham analyzing Apollo samples to decipher history of the moon; Profs. Miller, Wright, Sherrell, and Rosenthal drilling into ocean sediments to retrieve records of past climate; Profs. Falkowski, Yee and Kopp studying the origin of life and co-evolution of life and the environment; Prof Ojha discovering that these streaks on Mars are related to ice melting and moving down the crater; and Profs. Feibel and Lepre in Africa looking at the sediments recording past environments when and where humans evolved.



1. Who we are: **Earth and Planetary Sciences**

Small but vibrant student body



Undergrad Geology Club
with fun outings and
career fairs from alums



Our major
classes are
small (<15),
and
interactive



Simulating how NASA instructs Mars
Rover

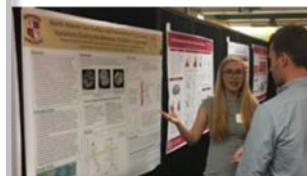


We have our own museum
to study rocks and fossils

Sophie Benaroya as NASA Intern



Undergrads
are
involved in
cutting-
edge
research



We have a vibrant and close-knit student body. Our undergrad Geology Club organize fun and educational outings and invite alums to talk about life (and careers) after graduation.

Given our size, our major classes are small, usually less than 15, allowing lots of student / instructor interaction.

Our undergrads are involved in research in faculty labs; 60% of Class of 2021 students did research projects. Student projects are supported by alumni-funded grants. Students have gotten internships at NASA and the U.S. Geological Survey.

Many courses have a field component. Students also take geology field camps, with part of expenses covered by alumni-funded awards.



Left: Adirondacks. Below: Angular unconformity in Nova Scotia, Canada



1. Who we are: Earth and Planetary Sciences

We love the great outdoors

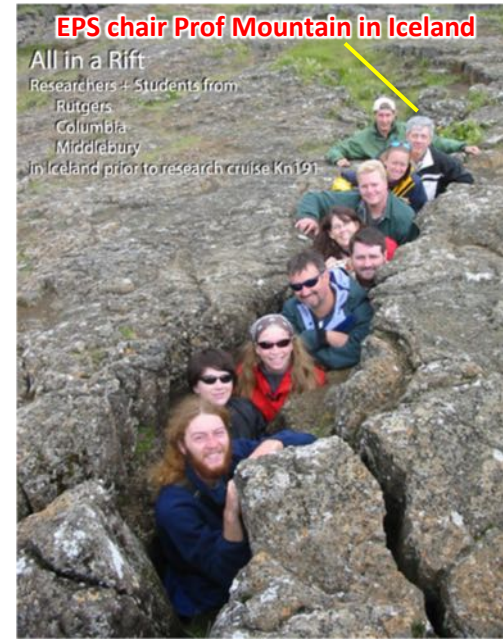


Grad students on research vessel

Nature inspired us to become Earth scientists in the first place



Prof. Feibel and class in Africa



EPS chair Prof Mountain in Iceland
All in a Rift
Researchers + Students from
Rutgers
Columbia
Middlebury
in Iceland prior to research cruise Kn191



Grad students testing field instrument

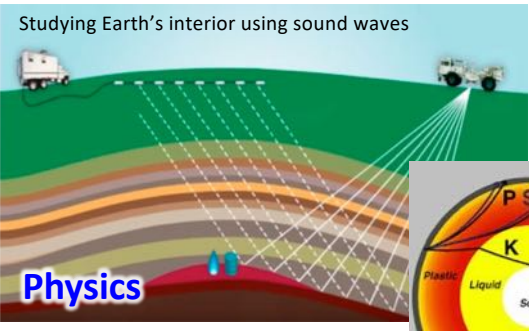


Prof. Withjack and class in NJ



Dr. Lepre in Africa

1. Who we are: Earth and Planetary Sciences



Physics

$$\frac{\partial \theta}{\partial t} = C \frac{\partial \Psi_{soil}}{\partial t} = -\frac{\partial q}{\partial x} + f = \frac{\partial}{\partial x} \left[K_{soil} \left(\frac{1}{\omega \rho g} \frac{\partial \Psi_{soil}}{\partial x} + 1 \right) \right] + f$$
$$f_S = \frac{\Psi_{RC} \phi \left(\left(\frac{\Psi}{b_S} \right)^{C_S} \right) d\Psi}{\Psi_{RC} - \Psi_S}$$
$$R_{R,H,I} = \frac{\beta_{R,H}}{f_{R,I} C_{R,I}}$$
$$f_{R,I} = \frac{\Psi_{R,I} \phi \left(\left(\frac{\Psi}{b_R} \right)^{C_R} \right) d\Psi}{\Psi_{R,I} - \Psi_{R,C}}$$

Mathematics

$$R_{\mu}(\theta, \phi) = R_{\mu}^0(\theta) + \frac{1}{2} \Delta \epsilon_{\mu}$$
$$+ \frac{1}{2} \left[\Delta \delta_{\mu} - 8 \frac{\partial^2}{\partial \theta^2} \Delta \gamma_{\mu} \right] \cos^2 \phi + \left[\Delta \delta_{\mu} - 8 \frac{\partial^2}{\partial \theta^2} \Delta \gamma_{\mu} \right] \sin^2 \phi$$
$$+ 2 \left[\Delta \delta_{\mu} - 4 \frac{\partial^2}{\partial \theta^2} \Delta \gamma_{\mu} \right] \cos \phi \sin \phi - \Delta \epsilon_{\mu} \sin^2 \theta$$
$$+ \frac{1}{2} \left[\Delta \epsilon_{\mu} \cos^2 \phi + \Delta \epsilon_{\mu} \sin^2 \phi + \Delta \delta_{\mu} \cos^2 \phi \sin^2 \phi \right.$$
$$\left. + 2 \left(\Delta \epsilon_{\mu} \cos^2 \phi + \Delta \epsilon_{\mu} \sin^2 \phi \right) \cos \phi \sin \phi \right] \sin^2 \theta \tan^2 \theta$$

θ = Angle of Incidence
 ϕ = Azimuth



Biology/Evolution

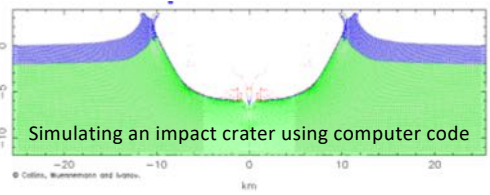


Using chemistry to study how mineral assemblages changed through time

Chemistry

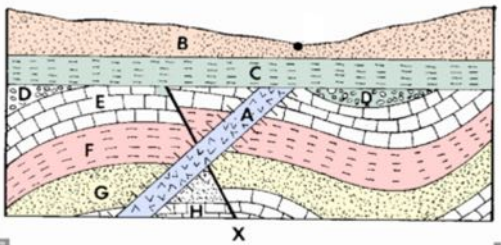


Computer Science



We love science but could not choose just one (so we are physicists, chemists, biologists, mathematicians, computer scientists, and historians, ALL IN ONE).

History



Earth is a complex system where physics-chemistry-biology work together, and we have to approach it that way.

2. What we offer: 4 Major options, 2 Minor options

Major
Geological Sciences
Option
B.S., 62 credits

Environmental
Geology Option
B.S., 63 credits

Planetary Science
Option
B.S., 63 credits

Liberal Arts / General
Option
B.A., 40 credits

Minor
Earth and Planetary
Sciences
6 EPS courses

Astrobiology
4 EPS, 2 Astrophysics
or Microbiology /
Evolutionary Biology
courses

	Geological Sciences Option		Environmental Geology Option		Planetary Science Option		General Option	
	Calc 1 & (Calc 2 or Stats)	8	Calculus 1 & 2	8	Calc 1&2 & (Calc 3 or Stats)	12	Calculus 1	4
Cognate	General Chemistry 1	4	General Chemistry 1	4	General Chemistry 1 & 2	8	General Chem. 1	4
Courses	General Physics 1	3	General Physics 1	3	General Physics 1, 2	6	---	---
	Subtotal: 15		Subtotal: 15		Subtotal: 26		Subtotal: 8	
	Intro Geology or equiv.	4	Intro Geology or equiv.	4	Intro Geology or equiv.	4	Intro Geology or equiv.	4
	Mineralogy	4	Mineralogy	4	Mineralogy	4	Mineralogy	4
	Petrology	4	Petrology	4	Petrology	4	Petrology	4
	Geochemistry	4	Environ. Geochem.	3	Geochemistry	4	---	---
	Major Events in Earth History	3	---	---	Major Events in Earth History	3	---	---
	Sedimentary Geology	4	Sedimentary Geology	4	---	---	Sedimentary Geology	4
	Paleontology	4	---	---	---	---	Paleontology	4
EPS	Structural Geology	4	Structural Geology	4	---	---	Structural Geology	4
Core	Geophysics	4	Geophysics	4	---	---	---	---
Courses	Field Geology	3	Field Geology	3	---	---	Field Methods	2
	---	---	Environmental Geology	3	---	---	---	---
	---	---	Hydrogeology	3	---	---	---	---
	---	---	---	---	Planet Mars / Moons & Planets	3	---	---
	---	---	---	---	Structure & Formation of Terrestrial Planets	3	---	---
	Subtotal: 38		Subtotal: 36		Subtotal: 25		Subtotal: 26	
	Elective	3	Elective	3	Elective	3	Elective (100 & above)	3
Elective	Elective	3	Elective	3	Elective	3	Elective (300 & above)	3
Courses	Elective	3	Elective	3	Elective	3	---	---
	---	---	Elective	3	Elective	3	---	---
	Subtotal 9		Subtotal 12		Subtotal 12		Subtotal 6	
	TOTAL CREDITS: 62		TOTAL CREDITS: 63		TOTAL CREDITS: 63		TOTAL CREDITS: 40	

Geological Sciences (BS): For students who expect to make geology an important component of their career, e.g. in engineering / environmental consulting, oil & gas & mineral exploration and mining, and federal and state government; grad school.

Environmental Geology (BS): For students who plan to work in environmental sector (largest employer of geoscientists in the U.S.), with focus on characterizing modern shallow subsurface environment; grad school.

Planetary Science (BS): For those who wish to pursue a research career in planetary science, e.g. in universities, research institutions and museums; strong math, physics, chemistry and/or biology; for math, physics, chemistry, biology transfer students.

Liberal Arts / General Option (BA): For students with interests in Earth and planetary sciences but plan for careers in science education/communication and journalism, medicine, environmental law and policy, and business, etc.

3. What courses you should take... ...to get you started

Introductory courses:

01:460:100 Planet Earth (3 cr): for non-majors

01:460:101 Introductory Geology (4 cr): for majors & minors

01:460:116 Building Blocks of Solar System (3 cr)

Signature Course:

01:460:110 Sea Change: Rise & Fall of Sea Level & Jersey Shore

Survey Courses:

01:460:201 Earthquake & Volcanoes

01:460:202 Environmental Geology

01:460:203 Building & Maintaining a Habitable Planet

01:460:204 Water Planet

01:460:206 Dinosaurs

01:460:207 Oil & Gold: the Good, the Bad, the Ugly

01:460:212 Earth & Life Through Time

01:460:213 Walk Thru Time: Evolution of Mammals

01:460:222 Planet Mars

01:460:224 Geology of Moons & Planets

01:460:225 Astrobiology

To view course offerings, go to:

<https://sis.rutgers.edu/soc/#home>

Select semester; then click on **New Brunswick & Undergraduate**; then select **460: Geological Sciences**

The courses listed here offer a window into our profession. All satisfy the **Natural Sciences** core requirement; some also satisfy the **Contemporary Challenges: Our Common Future** core requirement.

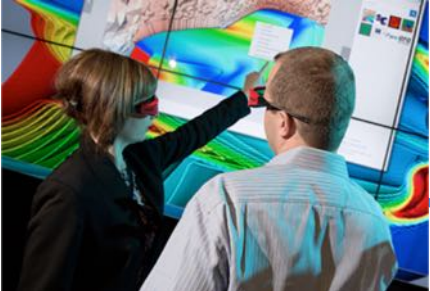
If you are interested in major/minor, take 460:101 first, which is required in all major options and the EPS minor. You can declare major/minor anytime after you complete this course with a grade of C or higher.



4. What to do with a B.S. degree: Jobs upon graduation

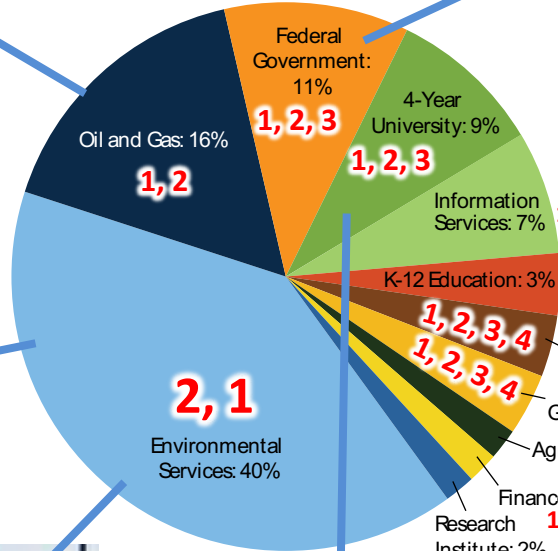
- The 4 Major options:
- (1) Geological Sciences
 - (2) Environmental Geology
 - (3) Planetary Sciences
 - (4) General (Liberal Arts)

40% of grads get jobs in environmental services, working to protect and clean up the environment (water, soil, aquifers)



Energy companies

Geological Surveys

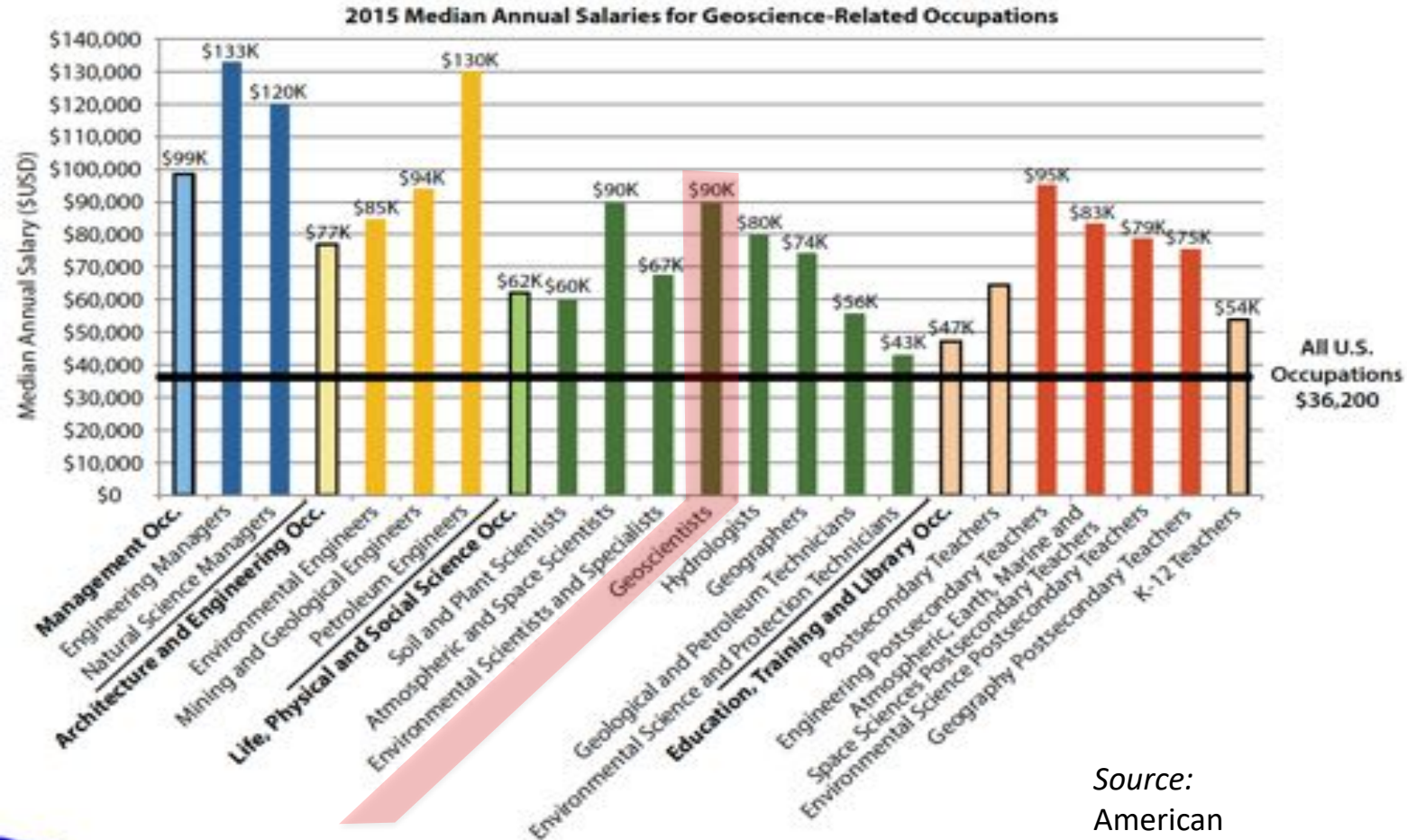


Graduate School



4. What to do with a B.S. degree: Jobs upon graduation..

Chart compares median annual salaries for all Earth-science related occupations to all U.S. occupations. Geoscientists make up the largest proportion of our graduates. Starting salaries are \$50-60,000.



Source:
American
Geological Institute

Summary

Earth & Planetary Sciences → *Careers that make a world of difference*

We are a small department, with world class faculty, and a small and vibrant student body...

We love the great outdoors, and we love all sciences but could not choose just one...

We care deeply about our planet, its past, its present and its future, and we want to make a difference...

We invite you to join us, and

- (1) Be a physicist, chemist, biologist, mathematician, computer scientist, and historian all at once*
- (2) Save lives by understanding natural disasters (earthquakes, volcanoes, floods, landslides...)*
- (3) Reduce the impact of humans on the environment to put our planet on a sustainable path*
- (4) Find the resources that society needs (minerals, energy, groundwater...)*
- (5) Explore how the Solar System, Earth, and life formed and evolved*
- (6) Secure a meaningful, rewarding and well-paid job*
- (7) Choose from 4 programs / career paths based on your personal interests and strengths*
- (8) Join a tight-knit community for the 4 career-formative years in your life.*

Our planet needs your talent and your passion

Questions? Email us:

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**For more information,
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EPS.rutgers.edu