Earth + Ocean + Atmosphere = Environment

We study and teach about all aspects of our planet – about its effects on us and how we affect it
• Undergrad degrees in: Earth Systems, Environmental Sciences, Geography, Geology & Ocean Science (starting this summer)
• Undergrad courses in: ATS, GEO & OC

• Roughly 100 faculty members in four broad disciplines:
  – Geography, Environmental Science & Marine Resource Management: GEM
  – Geology & Geophysics: G&G
  – Ocean Ecology & Biogeochemistry: OEB
  – Physics of the Ocean & Atmosphere: POA
• >$40 million/year research budget in nearly all aspects of Earth, ocean & atmospheric sciences + human dimensions
• Lots of opportunities to do research, help out in labs, go on cruises, and travel to wild and crazy places like volcanoes, ice sheets, tropical deltas, Coos Bay…?
• How to get involved…

**YOU DO NOT NEED TO MAJOR IN CEOAS TO GET INVOLVED IN OUR RESEARCH**

• More questions contact: Rob Wheatcroft, raw@coas.oregonstate.edu

http://ceoas.oregonstate.edu/people/browse/specialty/
Today’s roadmap...

• Brief presentations by faculty from
  – GEM: Julia Jones (Geography PH)
  – G&G: Andrew Meigs (Geology PH)
  – OEB: Rob Wheatcroft (Earth Systems PH)
  – POA: Andreas Schmittner (climate)

• Overview of the discipline and then a listing of specific research areas, w/ the faculty noted

• Followed by mingling (and cheese) in the foyer
Geography, Environmental Sciences, & MRM

- Human Dimensions of Earth Science
- Water Conflict Management
- Climate & Water Science
- GIScience

- Becker, Campana, Conway, Gosnell, Grubesic, Harte, Jenny, Jones, Nolin, Santelmann, Wolf
Agrarian change in Africa
Larry Becker (beckerla@geo.oregonstate.edu)
Water Conflict Management & Transformation

Aaron Wolf (awolf@geo.oregonstate.edu)

1. Water & Society
   - Population & Health
   - Culture
   - Human Security

2. Water & Economics
   - Globalization
   - Society & Environmental Capital
   - Economic Development

3. Water & Ecosystems
   - Risk, Uncertainty & Complexity
   - Integrated Water Resource Management
   - Desktop Modeling

4. Water Governance
   - Hydrodiplomacy
   - Conflict Resolution
   - Public Participation
   - Strategic Planning
   - Finance Administration
   - Public Policy & Law
Hydrology of Coastal Streams

Mary Santelmann, Wilkinson 258, santelmm@geo.oregonstate.edu
Climate variability and microclimate refuges in mountain landscapes

Julia Jones
(geojulia@comcast.net)
Geology & Geophysics

- VIPERS
- Geomorphology
- Tectonics, Geophysics
- Climate and Paleoclimate

- Brook, Carlson, Clark, de Silva, Dilles, Egbert, Goldfinger, Graham, Grunder, Haggerty, Haller, Harris, Kent, Kirby, Koppers, Lancaster, Meigs, Nabelek, Nielsen, Ozkan-Haller, Ruggiero, Schultz, Stoner, Tepley, Trehu
Evolution of Eyjafjalljokull volcano, Iceland

Anthony Koppers (Daniel Heaton)
akoppers@coas.oregonstat.edu
Steens Mountain, Steens Basalt

Anita Grunder (agrunder@geo.oregonstate.edu)
Studying volcanism and faulting using LiDAR

Andrew Meigs (ameigs@geo.oregonstate.edu)
Tectonic Geomorphology:
Surface processes in the service of geodynamics

Eric Kirby (ekirby@geo.oregonstate.edu)
Coastal Change Studies

- Participate in bathymetric and topographic surveying campaign measuring beach/nearshore evolution using GPS
- Become familiar with a wide range of coastal environments and coastal research programs
- Collaborate with researchers from DOGAMI, the Washington Dept of Ecology, and the U.S. Geological Survey (USGS)

Work on the beach!
• Sediment separations
• Magnetic measurements in the Paleo-and–Environmental Magnetism Lab (Get paid to do your homework)
• Field experience may also be possible

Leah Ziegler (lziegler@coas.oregonstate.edu)
Joe Stoner (jstoner@coas.oregonstate.edu)
History of Glaciation

- In Ireland, Antarctica, Scandinavia & North America

- Peter Clark (clarkp@onid.orst.edu)
Polar Ice Core Research at OSU

Ed Brook (ebrook@geo.oregonstate.edu)

Ice Core Drilling
Gas Analysis
Hunting for Meteorite Traces
Biogeochemical Modeling
International Collaboration and Education
Ocean Ecology & Biogeochemistry

- Elemental Cycles
- Food Webs (NPZ-> F, D&B)
- Global to local changes in the Anthropocene
- Land-sea Interactions

- Abbott, Benoit-Bird, Bernard, Ciannelli, Colwell, Crump, Fisk, Goni, Hales, Juranek, Letelier, Mix, Prahl, Reimers, Spitz, Torres, Waldbusser, Wheatcroft, White
Satellite Remote Sensing of the Coastal Ocean

Nick Tufillaro (nbt.osu@gmail.com)
BIOMAS simulated surface chlorophyll (mg m⁻³) shows the spatial pattern of the ICESACPE under-ice phytoplankton bloom on July 4, 2011, (white circle) Red circles: ICESCAPE 2011 Transect 1 Stations (Arrigo et al. 2012). White line: satellite ice edge.

Research Opportunities

- Analyses of circulation-ice-ecosystem model outputs and comparison with in-situ and satellite observations to show changes in the ecosystem

- Development of matlab scripts to analyze and visualize the model outputs and observations
Using microcosm experiments to better understand phytoplankton community structure

Ricardo Letelier (rletelier@coas.oregonstate.edu)
Salmon microbiome project
Byron Crump and Kathleen O’Malley

- Animals are symbionts with intimately-associated communities of microbes
- Human microbiome diversity varies with health factors and geography
- We know nothing about the Salmon microbiome
- Goal: Use DNA sequencing to identify and compare microbiomes in three salmon species from several coastal rivers in Oregon

Draft Hypothesis: Salmon-associated bacterial communities from gut, gill and skin correlate with river & hatchery of origin, and vary with salmon species.
Shell Aggregations & Feedbacks with Ocean Acidification
George Waldbusser
waldbuss@coas.oregonstate.edu
Deep Biosphere Research

Rick Colwell
rcolwell@coas.oregonstate.edu

Andrew Thurber
athurber@coas.oregonstate.edu

Research Opportunities

- Community diversity and biomass characterization in artificial methane seeps
- DNA extraction and characterization of microbial communities derived from deep subseafloor samples
- Cultivation and description of microbes from deep subsurface samples
Marine Geology Repository **Internship**

- Help describe and curate deep-sea sediment cores
- Potential independent research opportunities

- Maziet Cheseby (labtech1@coas.oregonstate.edu)
- Joe Stoner (jstoner@coas.oregonstate.edu)
Physics of the Ocean & Atmosphere

- Coastal Oceanography
- Satellite Remote Sensing
- Climate: Observations & Modeling
- High Latitude Oceanography
- Atmospheric Processes

- Barnes, Barth, de Szoeke, Dever, Hutchings, Kosro, Kurapov, Lerczak, Matano, Miller, Mote, Moum, Nash, Samelson, Schmittner, Shearman, Shell, Shroyer, Skyllingstad, Smyth, Strub, Thomas, Vong, Wettstein
Regional Class Research Vessel (RCRV) Project

- Help design the next generation of US research ships!
- Projects related to science outfitting of the vessels, “green ship” design alternatives, economic factors affecting ship construction, others?
- **Clare Reimers** (creimers@coas.oregonstate.edu)
Estuarine Physical Oceanography

Jim Lerczak (jlerczak@coas.oregonstate.edu)
Kipp Shearman
Autonomous Underwater Vehicle
Giders: Ocean-going Robots!

How the glider works
1. Diving: Glider runs on very small amounts of power, using change of buoyancy and weight to propel itself. Battery pack moves in the water, lowering the vehicle's center of buoyancy.
2. Rising: Glider surfaces above the water, releasing a ballast that causes the vehicle to rise. As the vehicle surfaces, the glider's buoyancy increases, propelling it upward.
3. Surfacing: Every six hours, the vehicle surfaces, releasing a ballast that causes it to rise. The vehicle's buoyancy increases, propelling it upward.
4. Recharge: After a month in the water, the vehicle is recharged and ready to be deployed again.

The glider's tools
- Sonar: Measures the depth of the water and the position of the vehicle.
- Doppler: Measures the speed of the vehicle as it moves through the water.
- Satellites: Tracks the vehicle and provides real-time data.

http://gliderfs2.coas.oregonstate.edu/gliderweb/
Sea ice observations & analysis

Jenny Hutchings (jhutchings@coas.oregonstate.edu)
Work to better understand climate change using computer models of the Earth’s oceans, atmosphere, ice and biochemical systems.
Faculty present

- Larry Becker (ag in Africa)
- Aaron Wolf (water conflict)
- Mary Santlemann (stream hydrology)
- Julia Jones (mtn. microclimate)
- Daniel Heaton (Iceland volcano)
- Anita Grunder (Steens Mtn. basalt)
- Eric Kirby (tectonic geomorphology)
- Andrew Meigs (LiDAR)
- Peter Ruggiero (nearshore)
- Leah Zeigler (paleomagnetics)
- Peter Clark (glaciation)
- Ed Brook (ice cores)

- Nick Tufillaro (remote sensing)
- Andrew Thurber (deep biosphere)
- Ricardo Letelier (phytoplankton)
- Yvette Spitz (Arctic modeling)
- George Waldbusser (ocean acidification)
- Byron Crump (salmon microbiome)

- Clare Reimers (ship design)
- Jim Lerczak (physics of estuaries)
- Kipp Shearman (gliders)
- Jenny Hutchings (sea ice)
- Andreas Schmittner (climate modeling)

- Rob Wheatcroft (general info & sedimentation in estuaries)