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Oceanography/Geophysical Systems Senior Research Lab

Dear Students,

Welcome Aboard! You applied and were selected for the Oceanography/Geophysical Systems Senior Research Lab. This lab explores the biology, chemistry, geology, or physics of the environment. This environment may include subjects such as the ocean, fresh water, the Bay, terrestrial habitats, wetlands, marine archeology, climate, meteorology, an organism or even a culture of cells to name a few. You are encouraged to develop original projects based on your interest and background that will add to the diffusion of knowledge in the scientific community. Your research may be an outgrowth of work in another elective or it may be altogether new. This year students used a variety of tools such as biotechnology, remote sensing, computer modeling, engineering, and chemical analysis to pursue areas of research related to genetics, biogeography, bioluminescence, physiology, robotics, nanotechnology and ecology. Each student or pair of students was in touch with an expert in the field. Most mentors and students connected with each other through email, Skype, or on the telephone. From as far away as England and as close as Washington, D.C., advice, materials and moral support were generously donated by both senior scientists and technicians. It was an exciting year!

Often the most difficult task is finding a good research topic and experiment. That's why it pays to start early and devote a significant amount of time and effort to the search. The stages of the research project include defining an idea, locating relevant information, writing a research proposal, maintaining a research log, designing an experiment, collecting data, analyzing the results, writing a research paper, presenting a PowerPoint presentation, and creating project posters. You are *strongly* encouraged to enter Regeneron (aka INTEL), science fair, VJAS, Virtual Poster Competitions etc.

Also keep in mind that certain research projects are seasonal. For example, harmful algal blooms, oyster diseases, jellyfish, and blue crabs are doable in the summer. This is partly because field work is easier in the summer– boats won't be dry docked and the weather is more pleasant, you don't need to miss school, but also because some of these topics will only present during our summer months. In colder months some of our organisms burrow, go further out to sea, or are dormant.

What is your summer assignment? Open your mind to ideas:

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Go to the beach. The summer is a perfect time for the ocean to serve as a source of inspiration. By the way, most beaches have a college or university nearby doing research. Stop in and look around. If you are in the Rehoboth, Bethany, Ocean City area, visit the College of Marine

Studies University of Delaware in Lewes, DE. In Virginia Beach, you are not far from the Virginia Institute of Marine Science (College of William and Mary) in Gloucester Point. The Outer banks have the University of North Carolina in Wilmington. Graduate students love to talk about what they are doing. You may even find a project you could work on. If you are interested in going out with the Smithsonian and working in one of their labs during the summer let me know. There are several different labs at the Smithsonian's Environmental Research Center in Edgewater Maryland (near Annapolis). They primarily focus on issues related to the Chesapeake Bay. It is possible for you to collect data during the summer and then continue in the fall with analysis. If you are unable to get to the beach take a virtual trip by visiting websites. Some even include field expeditions in progress.

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• **Visit the following Oceanography websites.** These are some of the best places to get ideas for "hot topics".

- **Woods Hole Oceanographic Institution (WHOI)**
- **The Scripps Institute of Oceanography**
- **Virginia Institute of Marine Science (VIMS)**
- **Smithsonian's Environmental Research Center (SERC)**
- **National Oceanic and Atmospheric Administration (NOAA)**
- **Smithsonian's Ocean Portal**
- **Visit the Sant Ocean Hall at the Smithsonian's Museum of Natural History in DC**
- **Explore sites specializing in oceanography databases such as RU COOL**

http://rucool.marine.rutgers.edu/

- **Visit daily or as often as possible the *E/V Nautilus* Live expedition is ongoing in the Pacific now. This is the expedition with Dr. Robert Ballard our keynote speaker for TJSTAR in 2014. It is live 24/7 but you'll want to check at different times to see the ROVs exploring the deep sea. You can write in questions to the scientists and they will answer you live on air. It is really addictive. You can mention TJ in your emails and that I was on board the expedition in October 2013 as was 2014 Grad Katie Valery. In 2016 grad Emily Sun was in the eastern Pacific and this past summer 2017 grad Ankush Joshi was aboard! Don't be shy. This helps to get your interests out there and find out what others are doing.** http://www.nautiluslive.org/
- **If you are interested in developing an app – look into citizen science projects.**

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As you visit sites, complete the following:

• **Select a topic or define areas (no more than three) of interest to you** (be as specific as possible). Consider your passion, classroom resources, and the fact that you will investigate this topic for one year.

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• **Find at least 3 resources on each topic.** These may include research articles, internet sources, or books. At least one of these resources must be a primary source (from a scientific journal, by the scientist). Read and review the resources and take notes on the information.

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• **READ a book from the summer list.** You never know where your next idea will come from. If you are sure about your topic, find a book on the specific subject.

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• **Keep a written log** of your notes on articles, websites, books, possible contacts, and your thoughts and questions as you progress through this process.

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- **Create a couple of slides with pictures of you in action this summer.** I prefer that these be showing your "scientific summer" but I am open to any that you would like to share.

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• **Use the Project Brief (see attachment)** as a guide for reviewing resources. You don't need to write a brief over the summer, but your notes on different topics should be guided by those questions. Be ready to discuss your summer efforts and ideas during the first week of class.

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- **TjSTAR** I would like to know if you saw any oceanography lab related projects at TjSTAR.

This was a perfect opportunity to see what is expected of you both academically and presentation wise. If you saw a presentation, please write a short review of what you thought.

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• **Keep in touch** with me during the summer. I will be in Cuba in July with students doing shark tagging, manatee tagging, lionfish surveys, and coral reef research. We will be working with the University of Havana, Oxford University and be on the Isle of Youth. I will have limited access to email at this time. Generally you can reach me at
llwu@fcps.edu
lisa.l.wu@gmail.com

Have a wonderful summer!!