



Davey Jones' Locker **Seafloor Mapping/Marine & Coastal GIS**

So ye wish to join my crew, eh? **Information for Prospective Graduate Students**

Introduction

Thank you for your interest in the Davey Jones' Locker Seafloor Mapping/Marine & Coastal GIS Laboratory, as well as graduate study in geography at Oregon State University (OSU). Deciding on what graduate school to attend can be quite a Difficult decision. Therefore, I'd like to give you some information about my research, my lab, my philosophy, and the program options here OSU. In this way, you as a prospective graduate student can decide whether or not my lab is likely to be a good fit for you. If, after reading this, you still think that you might want to "join my crew," then please get in touch with me by email so that we can discuss options further.

First of all, my appointment at OSU is in the Geography Program (http://www.geo.oregonstate.edu/Geography_Program) within the Department of Geosciences (<http://www.geo.oregonstate.edu>) in the College of Science (<http://science.oregonstate.edu>) here at OSU. Our department actually runs two separate graduate degree programs and application processes (geography and geology). I take students seeking the M.S. or Ph.D. in geography. I also hold an adjunct appointment with the College of Oceanic and Atmospheric Sciences (COAS) (<http://www.coas.oregonstate.edu>). Many of the students in my lab have combined their major in geography with the graduate certificate in Marine Resource Management (<http://bit.ly/SGqFf>) within COAS. Anyone interested in my lab should also take a close look at the graduate certificate in geographic information science (GIScience) (<http://geo.oregonstate.edu/gcert>), our comprehensive GIS@OSU site (<http://geo.oregonstate.edu/ucgis>), both hosted by OSU Geosciences, and in the OSU Marine Science Portal (<http://www.coas.oregonstate.edu/marineportal>) hosted by COAS. Students sharing my research interests will benefit from participation and interactions in these related programs.

In terms of my background and research, I hold an individual interdisciplinary Ph.D. in physical geography and marine geology from the University of California at Santa Barbara. My research interests over the years have been in marine geographic information systems, marine data modeling and cyberinfrastructure, and hydrothermal activity and tectonics of mid-ocean ridges. Over the years I have participated in over 20 oceanographic research expeditions worldwide, including 10 legs of the Ocean Drilling Program and 3 dives in the Alvin submersible. My research currently focuses on:

- coastal/ocean cyberinfrastructure (where "cyberinfrastructure" refers to advanced collaboration tools and facilities over the web, data storage and

- visualization tools, the integrative capabilities of high-performance computers, and sensor webs in the environment);
- geographic information science applied to the coasts and oceans (data models, GIS analysis procedures and tools, metadata and ontologies);
 - benthic terrain/geomorphological characterization for habitat mapping (especially of South Pacific coral reefs in marine protected areas), including also the development and validation of seafloor/seabed classification schemes;
 - processing and interpretation of high-resolution bathymetry and underwater videography/photography;
 - coastal web atlases (web GIS) -- their development and use for coastal resource management and marine spatial planning.

My work also involves quite a bit of national and international academic service these days. For example, I was recently a member of the National Academy of Sciences' Committee on National Needs for Coastal Mapping and Charting. Current National Academy of Science service includes the Ocean Studies Board, the Committee on an Ocean Infrastructure Strategy for U.S. Ocean Research in 2030, and the Committee on Geophysical and Environmental Data. I am also the co-leader of the new International Coastal Atlas Network (<http://ican.science.oregonstate.edu>) in collaboration with colleagues in Europe, Africa, and across the U.S.

My students have interesting projects to pursue in the lab to be sure, but given the availability of funding, I try to get students involved in field work at sea, or in national and international workshops where possible. I am always writing proposals to fund my research and my students, and these are usually submitted to several programs at NSF and NOAA. On rarer, occasions I'm involved in proposals to the Office of Naval Research and agencies within the Department of the Interior.

Application Basics

With regard to applying, you'll need to send your application to the OSU Graduate School, which will then determine your eligibility for admission and forward the application to our department. Please see the helpful information on our department web site (http://www.geo.oregonstate.edu/Geography_Requirements) and the section on Graduate Application Process and Deadlines (http://www.geo.oregonstate.edu/Application_Process), in order to get started. Applications indicating an interest in working with me are routed to me for consideration, along with at least 2 other faculty members. Your application therefore must include a compelling statement of purpose. This is an extremely important part of your application, so I encourage you to download this brief *guide to writing an effective statement of purpose* (attached). It is very simple and may help you to develop a better application package to our competitive program. And, of course, you should peruse the rest of my Davey Jones' Locker web site, if you haven't done so already.

Our annual application deadline is **December 8th**, so we encourage students to apply before November, if possible. This gives our faculty and staff plenty of time for the most effective processing of your application, before the frenzy leading up to the ultimate deadline. That December 8th deadline is particularly important for students who wish to be considered for financial assistance. And my own preference is to accept students who can start at the beginning of academic year, in the fall term, as there are so many key courses and orientation activities in the fall.

Life in Davey Jones' Locker

In terms of additional specific considerations for my lab, I do expect a few things. First of all, it is important to me that everyone in my lab is able to get along. You don't have to become best friends with everyone you meet, but students in my lab **MUST** be able to show courtesy and respect to fellow students and colleagues, and to keep their workspace neat and tidy. A research lab works or fails based on how the lab functions as a whole rather than the individual efforts of anyone in the lab (including me). Therefore, I expect you to be a good colleague to others by helping to maintain lab morale, lab organization and lab cleanliness, and to contribute intellectually to the projects of your lab mates. We run a tight but happy ship!

This also plays heavily into my advising style, which is to meet with each and every one of my students *one-on-one*, once per week to track their progress, advise them, and support them in any way that I can. We do these weekly meetings throughout the fall and the winter terms. Then in the spring term, we meet once a week as a lab *group*, where everyone is together and can share more readily with each other what they are up to, or in what direction they'd like to go. By that time, the first-year students have been through two of the key required courses in our program and should have their graduate program of study form completed, as well as a first draft of a thesis proposal. They can help each other further in the lab meetings, as well as receive advice from the older students. And we have SNACKS every week too!

I am excited about interesting marine GIScience and marine geomorphology questions and applications, and I want to accept students who will strive to broaden my horizons as well as their own. I favor students who are extremely self-sufficient, motivated and willing to work very hard to excel in their field. I am looking for students who have a solid background in geography, GIS, marine science, and even computer science (see below). I am looking for students to display a high degree of creativity, integrity, independence, and self-motivation. I expect my students to read broadly in the current literature and on the web, to attend and present at departmental seminars and scientific meetings, and to devote themselves to learning the techniques and analyses required to conduct and publish a good scientific or a good resource management study.

This also means that you must work on honing your oral and written communications skills. Although oral and written communication is frequently overlooked in undergraduate science education, and almost always under-

appreciated by applicants to graduate school, it is a critical component of becoming a successful scientist. Regardless of your field or laboratory skills and accomplishments, you really only receive professional credit when you are able to write successful proposals and publish research papers in high-quality journals. Therefore, I cannot overemphasize how important it is to take every opportunity to improve your oral and written communication skills. I would recommend that every student take at least one scientific writing class before starting graduate school.

Computer Geeks Welcome!

I also cannot overemphasize the importance of good computer skills. I am becoming increasingly involved in research collaborations with computer scientists, and am therefore looking for students these days who have some background in computer programming or scripting, OR who are not afraid to learn this as a new skill. This is in the realm of *moving beyond just using GIS to look at data or make a map, to actually developing and customizing GIS, as well as new GIS analysis models*. If you do have experience with Python scripting, Java or Java scripting, VBA for ArcGIS, VB.NET for ArcObjects, ASP.NET, or even mashups with Google Maps, with ArcGIS Server or with open source mapping applications, this is a special plus. Again, if you are willing to enthusiastically learn one or two of these while in my lab as a student, that is terrific as well. Scripting and programming are becoming increasingly important to learn for the current generation of GIS specialists and GIScientists.

A Special Note to Prospective Marine Resource Management (MRM) Students

I love working with students in our Marine Resource Management Program (MRM). Unfortunately though, I very rarely take them as my major advisees. Due to the current structure in our university, neither I nor my department receive administrative credit for advising an MRM degree to completion. This is because my primary appointment and full-time equivalency (FTE) are in the College of Science, whereas the MRM program is in COAS, where I have adjunct status. And at this time there is no "double-counting" of a degree between the two colleges if the student is advised, funded, and partly housed (research lab-wise) outside of COAS. In addition, I could not readily offer to an MRM student a full, 2-year *teaching* assistantship (I can only do this for students in my own unit).

However, as an adjunct professor in COAS and a participating MRM faculty member, I do have a lot of MRM students who take my courses and declare for our graduate certificate in geographic information science (<http://geo.oregonstate.edu/gcert>) I also serve on MRM graduate student committees as a regular committee member (not major adviser). There are many, many students who already want to major in geography (my primary unit) where they can immediately work with me as their major professor for an M.S. or Ph.D. in geography, and do a research emphasis in marine geography or marine GIS, etc. Again, several of my students also choose to do the graduate certificate in MRM, which is a wonderful option too.

So if you are interested in MRM, I would still encourage you to apply to that program, but I would likely not be available to you as a major adviser. If you work with me, you could consider obtaining the MRM certificate.

Some of The Necessities of the Academic Life

The graduate students in Davey Jones' Locker have traditionally been a close-knit group with whom I interact regularly both professionally and socially (see the Rogues page, <http://dusk.geo.orst.edu/djl/rogues.html>). Students have found the facilities and intellectual climate of Oregon State University, the Department of Geosciences, the Hatfield Marine Science Center (<http://hmsc.oregonstate.edu>) on the Oregon coast, COAS, and Davey Jones' Locker to be exceptionally favorable to their growth and development as scientists. I, in turn, consider the graduate program to be an integral and necessary part of my own continued professional and personal growth. As mentioned above, I expect and encourage considerable independence in each student's research activities. My students are supported during their graduate careers by a combination of teaching assistantships (TAs), research assistantships (RAs) and scholarships, including over the summer term. Most of my students have been funded for a good portion of their time here as research assistants on my grants. I am always working on new proposals, and in the interim, try to get my students funded on teaching assistantships. More information about assistantships in our department can be found on our assistantships page (<http://geo.oregonstate.edu/Assistantships>) and information about graduate funding at OSU in general is available from the OSU graduate school (http://oregonstate.edu/dept/grad_school/future/financing.html)

Final Words of Advice

If you are really interested in being considered as a member of my lab, then I hope that you'll take the time to look through the rest of the lab web site to understand better what sort of research we do. After that, if you are interested in the same sorts of things that my students and I are interested in, I would welcome a very brief research proposal outline to explain what research you would like to do as a graduate student, along with your educational background and any relevant previous experience in science (e.g., it's always a good idea to include a resume or CV with your email). You will need these items for virtually any graduate school application anyway, so it will save you some time later on. It should also greatly improve your chances with any potential advisers when contacting them with this information, even if my lab ends up not being a good fit for you.

When seeking to select a graduate program in general, the bottom line is to ask yourself several questions: Where are you likely to get the best opportunity to gain the background necessary to excel in whatever career you choose (whether that be an academic position, a government position or in private industry)? Will you get the educational opportunities and guidance that you need? Will you have the resources and equipment necessary to complete your research? Will you have

enough support to live comfortably during your time in graduate school? These are the sorts of questions that you need to consider before making your decision. Graduate school is often stressful, and I don't know of any students who have not questioned their decision to go to graduate school at some point during their studies. If seriously considering OSU, you should definitely try to contact the graduate students in my lab (<http://dusk.geo.orst.edu/djl/rogues.html>) to find out more about their experiences and views of the program as well. They are in the exact position that you will find yourself in a few years, if you are accepted to our program.

Conclusion

So having read this far, if you think you would be a strong candidate for acceptance to graduate school at OSU, as well as graduate student research in Davey Jones' Locker, I would definitely encourage you to contact me and to apply. By way of a new policy, I am more likely to admit students after I have met them, so if you rank high on the list of applicants (as determined by the Geosciences Graduate Admissions Committee in January/February), I will encourage a visit. This is indeed the best way to learn about us here at OSU, and to decide whether OSU and my lab environment will give you the best opportunity to excel in your graduate career. Some students wait until after they have been accepted in the spring to visit; others (usually who are closer, or who are visiting several west coast schools) come in late February to early March. Unfortunately, students must visit at their own expense, but if you decide to visit, please send an email to our graduate applications coordinator, Stacey Schulte (schultes@geo.oregonstate.edu), with a cc to me. Stacey can help you plan your visit.

All best wishes for smooth sailing,



Dr. Dawn Wright
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With many thanks to Rob Toonen, Hawaii Institute of Marine Biology
and the Lubchenco/Menge Lab, OSU Zoology, for helpful ideas and text.
This document available online at <http://dusk.geo.orst.edu/djl/newcrew.html>

Do's and Don'ts for your Statement of Interest/Statement of Purpose

*Thanks to Rob Toonen, Hawaii Institute of Marine Biology, University of Hawaii
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Do's:

- Explain something about yourself, your self-discipline, time management skills, motivation, and drive for seeking a graduate degree in your field.
- Mention scientific accomplishments that you are particularly proud of and why – try to explain to the committee how you evaluate yourself in terms of accomplishments and productivity.
- Try to present a clear and well thought-out idea of who you are and what you would like to do in graduate school.
 - Briefly introduce a general problem of interest to you (why would anyone care?), and then get to the specific area of your interest.
 - Explain what you would like to accomplish with regards to resolving some open question – BUT don't come across as dogmatic or claim that you're going to solve any of the world's problems! (see DON'TS below)
- **IMPORTANT: Specifically mention any faculty member that you would like to work with, and whether you have contacted them about the possibility of working in his or her lab.**
- Explain why you think that lab or graduate program is a great place and would be a good fit for what you are looking for from your graduate education – i.e., what are the specific reasons that you are applying to THIS program as opposed to any other?
- Explain what your ultimate career goal is (e.g., a GIS analyst, resource manager, faculty position at a major research university, etc.).

Don'ts:

- Take more than a couple of pages to make your point – admissions committees have to read a couple hundred of these things, and the statements that make a compelling case for acceptance in 1-2 pages are MUCH more successful than ones that ramble for 5 pages (and are never read to the end because they are too long!). On the other hand, don't shoot off a statement that is only 1 or 2 paragraphs long either!
- Have any typos, spelling mistakes or missing punctuation. Like it or not, writing is an essential part of being a successful scientist, and a poorly written statement is **always** a red flag to admissions committees!
- Try to be cutesy and tell nice stories about how your love of squirrels and dolphins as a child has led you to want to save the world – this is a career path that you are trying to pursue, and attempts at being overly cute or humorous are almost always considered unprofessional.
- Claim that you'll solve some global problem – individuals can only ever do a small part by ourselves, and although we can each advance knowledge about the natural world, we're just not going to solve some burning problem by ourselves in grad school. If it were that simple, someone would have probably done it already!
- Appear to be too set in your ways – you want to convey an interest in an area and show that you've given it some serious thought, but not come across as dogmatic or stubborn (if you can, communicate to your prospective adviser about a possible project, and describe that in your statement).
- Say anything negative about anyone or anywhere else – no one wants to hear you put down the program or advisers at another college (even if they agree with you), and being negative simply belittles your application.

STATEMENT OF INTEREST/STATEMENT OF PURPOSE

Example from a successful M.S. applicant

How does the underwater world connect to the land that we know so well? What happens beyond the coastline in order for it to function as such a tremendous boundary between our terrestrial home and the deep sea? I would like to grasp these concepts in such a way that I can share the ideas and visualizations with anyone.

I that feel Oregon State University, as a known research university, is a place where I can gain the knowledge and experience needed to accomplish my goal of integrating GIS and ocean research. My thoughts for further my education are best said in the words of Sylvia Earle at the 1999 ESRI User Conference. She is quoted in an excerpt from *ArcUser* magazine: "In the last decade, improvements in GIS tools have provided a quantum leap in our ability to understand and manage marine ecosystems. Foremost among these new tools is three-dimensional GIS data modeling. Now suddenly I can see so much as never before in context. It's that kind of 'ah-ha' breakthrough that these new integrating data systems allow. I can't wait to see what's going to happen as we begin to work together."

I became interested in marine and coastal studies during a project with the Center for Coastal Studies at Texas A&M University-Corpus Christi. As an undergraduate research assistant, I developed a pilot project for riparian assessment, primarily using ArcView 3.2 and Image Analyst. By studying land use distribution and flow analysis, I determined watershed boundaries and queried riparian habitat classified from TM imagery along the major drainage areas within the five coastal counties of the Texas Coastal Bend. My paper, "Using ArcView GIS in Assessing and Preserving and/or Restoring Riparian Habitat," was published in the 2000 ESRI User Conference Proceedings. In the summer of 2000, shortly after leaving my position in coastal studies, I went to the University of Washington as an intern for OUREarth, a NASA Space Grant program. My experience with the Department of Oceanography was invaluable. Under the direction of Dr. Miles Logsdon, I used Arc/INFO to delineate the Columbia River watershed. It took some historical research and the collection of several data sets to complete the tasks needed for an ongoing project for the Pacific Northwest Climate Impacts Group. The scope of their project amazed me. To model the entire ecosystem within the Columbia River watershed is so extensive. For the first time, I understood how powerful GIS is for environmental research and visualization....

Since graduating with a B.S. in geographic information science, I have felt a strong desire to choose a specialized field. For the last year, my position as GIS specialist at Digital Mapping Services (DMS), a GIS company in Corpus Christi, Texas, has been ideal for exploring my options. I have used ArcGIS 8.1, All Topo Maps, Orthophotos, Adobe Acrobat, MS Access, and other software on a Windows workstation for most of the projects at DMS. Most of the projects involve oil-and-gas well and pipeline locations, with some significant work in locating camera locations for the U.S. Border Patrol on the Texas/Mexico border. In considering marine and coastal studies, my desire to pursue a career in the field was strengthened when I participated in a hydrographic survey. While spending time on the Corpus Christi Bay recording sonar images and magnetometer readings, I found satisfaction in this type of fieldwork. I continued by processing and

analyzing the sonar imagery in Seascan Review and ArcScene to distinguish anomalies. This is the job that confirmed my passion to be on the water and also to show the client what the bay floor “looks like.” The power of mapping and three-dimensional visualization is unlimited.

I look forward to earning my Master of Science in Geography with the understanding that I am still leaving my options open in a broad field. For this reason, I have researched some of the opportunities at OSU. My desire is to be part of research that will narrow the scope of my degree without disregarding the immense world of ocean GIS. Ideally, I would like my graduate research to incorporate the preservation of marine sanctuaries around the South Pacific islands. I understand the Dr. Dawn Wright has done significant research around American Samoa. Her work history and current pursuits for more opportunities through grants are impressive. Dr. Wright actually had a great influence on my decision to apply to OSU, and I would like to request that you consider me as a graduate research assistant under her direction. Her enthusiastic response to my inquiry about the program via electronic mail made my decision to apply more concrete. Furthermore, because of the good reports that I have found about OSU, I am excited to be part of the Geography program in any case. I hope you will give my application a sincere consideration.

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STATEMENT OF INTEREST/STATEMENT OF PURPOSE

Example from a successful Ph.D. applicant

I am writing to express my interest in pursuing the Ph.D. in geography in the Department of Geosciences. I am excited by the prospect of performing research and broadening my knowledge of geographic information science, and I believe I would make an excellent doctoral candidate. Professor Dawn Wright and I have discussed the Ph.D. program and she has agreed to serve as my major professor should I be accepted.

I am passionate about geography, GIS, digital cartography, and ecology, and have worked with GIS software, spatial data, and related technologies since the early 1990s. After completing a double major for my BS in Biology and Environmental Studies, I began doing basic GIS analysis for the National Park Service Research Unit at Yosemite National Park using GRASS. Later I moved to Arc/INFO and ArcGIS in subsequent position while performing more complicated analyses and data manipulation. I put together an integrated minor with a concentration in GIS and statistics for my Master's degree in Botany and Plant Pathology at OSU, where my research involved predictive modeling of the suitable habitat for a lichen species in the Oregon Coast Range, using multivariate statistics and advanced GIS raster algebra techniques. During that time I completed multiple graduate-level courses in GIS and cartography through the Department of Geosciences, and spent a great deal of time doing self-directed research into GIS and methods of spatial data analysis, particularly with raster datasets. In 1999, I was selected to serve as an ESRI Student Assistant, which paid my way to the annual ESRI GIS User Conference, where I presented my research and won second place in the "Most Analytical" category of the Map Gallery competition.

My research interests include spatial data structures, spatial databases, and the use of open source software tools in devising more efficient methods for the manipulation, display, and analysis of complicated spatial data. My prior academic background has focused on biology and plant ecology, where I maintain an active interest. I am particularly interested in researching new methods for linking spatial databases (e.g., stored in PostgreSQL/PostGIS) with other, distributed ecological and sensor databases and datasets, and developing tools that allow the user to perform complicated spatial analysis through a standard web browser. Together with recent advances in the use of Open Geospatial Consortium (OGC) standards for the sharing of spatial data, as well as nascent technologies such as the semantic Web, I believe there exists great promise for this type of distributed yet integrated approach to data discovery and analysis. Given my interests and experience, after speaking with Dr. Julia Jones, I believe may be a good candidate for the Ecosystem Informatics minor.

I am currently employed on the OSU campus with a research group, the Northwest Alliance for Computational Science and Engineering, where I hold the titles of GIS Coordinator and Web Development Engineer. I am responsible for managing all projects that include GIS analysis or application development, and oversee the efforts of several full-time employees, graduate students, and undergraduate students. In 2002 I began experimenting with open source GIS software as a solution to some of the more

challenging data conversion and application development problems faced in our grant proposals. These software programs (MapServer, PostgreSQL/PostGIS, PROJ.4, GDAL, OGR, etc.) gave me a platform for developing tools that allow users to browse, query, and interact with highly complicated and resource-intensive spatial data via a Web browser. I have given presentations on my work to a broad range of audiences: nationally at various conferences and to groups such as the LTER, NBII, and USFS, and locally to the Mid-Willamette Valley GIS Users Group and various research groups and classes at OSU. Additionally, I have authored or co-authored several publications in peer-reviewed journals.

Although I have been involved with the grant writing process many times, and have served as co-PI on a few grants, I am not in a position to direct research or serve as PI on large research projects such as those for which we've received NSF funding. I want to pursue a Ph.D. not only because I would like to actively pursue grant opportunities and direct research at a higher level, but also because I know I would benefit personally from the increased depth and breadth of knowledge and experience I would gain from the process. After earning the Ph.D. I would like to either continue in a high-level research position or work in academia as a professor. I would love to advise students and teach courses in spatial technology, natural resource, or a combination of the two.

Thank you for considering my application.

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