

## **COURTNEY K. HARRIS - NARRATIVE STATEMENT - SEPTEMBER, 2006**

Faculty at VIMS address three mandates; “The Virginia Institute of Marine Science ... has a three-part mission to conduct interdisciplinary research in coastal ocean and estuarine science, educate students and citizens, and provide advisory service to policy makers, industry, and the public”. I contribute to each of these, with an average allocation of effort of 58% research, 21% education, 15% advisory, and 6% governance. The following describes my activities within each category.

### **RESEARCH:**

My research strives to develop methods for predicting water column turbidity and sediment deposition within the coastal ocean and estuaries. Since arriving at VIMS, I have established my research program, developed a diverse funding base, maintained participation in multi-institution projects, and publicized our results.

Prior experience with bottom boundary layer theory, numerical modeling, and field observations has positioned me to contribute to cutting edge problems in coastal sediment transport. At VIMS, I have developed a three-dimensional model of gravity-driven fluid mud transport [*Harris et al.*, 2004; *Harris et al.*, 2005], and identified dominant dispersal mechanisms in diverse settings including the New York Bight, Adriatic Sea, and northern California Shelf [*Harris et al.*, 2003; *Harris et al.*, 2007; *Harris and Wiberg*, 2002]. Recent research focuses on locations that experience high accumulation, such as offshore of sediment-laden rivers in New Zealand (the Waipaoa and Waiapu Rivers), and the Po River, Italy. The spatial variability of freshwater plumes has motivated me to adopt three-dimensional numerical models for describing depositional processes in the coastal ocean.

Ongoing research interests also include interdisciplinary problems whereby water column turbidity and depositional processes impact ecosystems. Recently funded projects seek to improve sediment resuspension estimates for water quality modeling in Chesapeake Bay, and predictions of hypoxia in the Gulf of Mexico. Another funded project is exploring feedbacks between benthic communities and sediment resuspension in the York River.

Funds for my research have come from the National Science Foundation (NSF), Office of Naval Research (ONR), US Geological Survey (USGS), National Oceanographic and Atmospheric Institute (NOAA), US Coast Guard, and the Maryland Department of the Environment. As PI, I have been continually funded by the ONR's Coastal Geosciences and Physical Oceanography Programs. I have collaborated with others at VIMS on three projects funded by NSF; one successful proposal each has been submitted to the Marine Geology and Geophysics, Margins, and CoOP Buoyancy Programs. This diverse funding base has supported graduate students and a technician, and contributed to VIMS' infrastructure through purchase of a 24-processor high-performance computer.

### **EDUCATION:**

I have co-taught three regular courses at VIMS, including MS520 (Coastal Physical Oceanography), MS553 (Bottom Boundary Layers and Sediment Transport), and MS554 (Principles of Numerical Computing), and will co-teach the core course, MS502 in the spring, 2007. Dissemination of my sediment transport class notes on the internet has resulted in their use at universities including U. of Washington, Texas A&M, and Oregon State. I've also taught four seminars (MS698) that dealt with specialized topics including sediment-transport models and interdisciplinary estuarine hydrodynamic

modeling. Enrollment in my classes has ranged from three to nine students, with an average class size of six students.

As an advisor, I provide students with the necessary funding and equipment, and try to instill in them the rigor needed to advance understanding of sediment transport mechanisms. I have supervised two M.S. students and three Ph.D students, and served on another ten student thesis committees. One of my M.S. students has graduated, and elected to pursue a Ph.D. Another Ph.D. student anticipates graduation by winter, 2007. An undergraduate student, mentored as part of the REU (Research Experience for Undergraduates) is pursuing coastal geology in her graduate school education. With my students, I have one paper in review, and four papers in preparation. All have presented research at either an American Geophysical Union (AGU) or Estuarine Research Federation (ERF) meeting. Three of my students will contribute to papers at the fall, 2006 meeting of AGU.

#### **ADVISORY, PROFESSIONAL SERVICE, and GOVERNANCE:**

I have contributed to national, state, and local research and policy communities within both funded research projects and informal advising. I am working with the Army Corps of Engineers (ACOE) to develop resuspension calculations that should improve the EPA Chesapeake Bay Program's water quality model. Recently, I helped NOAA's GLERL (Great Lakes Environmental Research Lab) adopt the sediment transport model of Harris and Wiberg [2001] to study resuspension. Both of these efforts will be presented at the fall, 2006 meeting of AGU. In 2003, I served as an external reviewer of the Littoral Sedimentation and Optics Model (LSOM), a Naval Research Laboratories (NRL) effort to provide real-time predictions of resuspension to the US Naval Fleet.

As a proponent of the need to develop community models for coastal oceanography and sediment transport, I organized meetings and wrote proposals to the National Oceanographic Partnership Program (NOPP). I co-convoked a meeting of fifty scientists to develop a plan for a coastal community sediment transport model [see *Sherwood et al.*, 2002]. That grew into a successful NOPP proposal led by the USGS. I've been active in developing and testing the Regional Ocean Modeling Systems' Sediment (ROMS-SED) Module [see *Warner et al.*, 2007]. Demonstrating commitment to community modeling, the Harris and Wiberg [2001] model is available for download on the internet, and has been used by researchers and students in Europe, Australia, Indonesia, Asia, and in the US at NOAA-GLERL and LSU. Undergraduates at Humboldt State University adopted my gravity-flow model of the Eel River Shelf [*Harris et al.*, 2004] as part of their senior project and will present results at the fall, 2006 meeting of AGU.

I serve on the editorial advisory board of *Continental Shelf Research*, and review numerous journal articles and research proposals each year. Since coming to VIMS I've participated in NSF workshops for the Margins and the Community Sediment Dynamics Modeling System (CSDMS).

My effort in VIMS governance continues to grow. In co-chairing the VIMS Seminar Committee, I tried to increase attendance by inviting leading scientists who did interdisciplinary research and were great speakers. I have served on several VIMS committees, including Admissions, Nominations and Elections, IT Infrastructure, Parking, Best Student Paper, and Library Advisory. Recently, I've become chair of the Academic Status and Degrees Committee (AS&DC).

**REFERENCES:** See Curriculum Vitae or List of Publications