

NOMINATION COVER SHEET
2008 Virginia Outstanding Faculty Awards

1. NAME Full (Legal): Carl T. Friedrichs

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2. INSTITUTIONAL INFORMATION

Institution: College of William and Mary

Rank/Position Title: Professor

Year Rank/Title Attained: 2006

Years at Institution: 14

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3. PROFESSIONAL INFORMATION

Academic Discipline: Marine Science

Specialization/Field: Geological Oceanography

Type of Terminal Degree: Ph.D.

Year Awarded: 1993

Awarding Institution: Massachusetts Institute of
Technology/Woods Hole Oceanographic Institution
Joint Program

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Table of Contents

Cover Sheet	1
Mission Statement	2
Summary of Accomplishments	3
Personal Statement.....	9
Abbreviated Curriculum Vitae.....	11
Letters of Support (Excerpted)	13
Additional Documentation	16

Please check only ONE box:

- RESEARCH/DOCTORAL INSTITUTION NOMINEE:
- MASTERS/COMPREHENSIVE/BACCALAUREATE INSTITUTION NOMINEE:
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- RISING STAR NOMINEE:
- TEACHING WITH TECHNOLOGY NOMINEE:

President or Chief Academic Officer

Signature:

Printed Name: _____

College of William and Mary Mission Statement (Excerpt)

At William and Mary, teaching, research, and public service are linked through programs designed to preserve, transmit, and expand knowledge. Effective teaching imparts knowledge and encourages the intellectual development of both student and teacher. Quality research supports the educational program by introducing students to the challenge and excitement of original discovery, and is a source of the knowledge and understanding needed for a better society. The university recognizes its special responsibility to the citizens of Virginia through public and community service to the Commonwealth as well as to national and international communities.

Virginia Institute of Marine Science/School of Marine Science Mission Statement (Excerpt)

The College of William and Mary's Virginia Institute of Marine Science, within which is imbedded the School of Marine Science, has a tripartite mission involving research, education and advisory service. These three missions are mutually supportive, synergistic, and tightly intertwined; they function as a seamless whole. The research activity provides essential support to the other two missions and is the source of the information that we are charged with providing to our client groups within the Commonwealth, as well as the foundation of our graduate education program.

Carl T. Friedrichs, Summary of Accomplishments

Dr. Carl Friedrichs is highly talented and motivated educator, a world-class marine scientist, and a dedicated public servant. The College of William and Mary is pleased to nominate him for a 2008 Virginia Outstanding Faculty Award.

As an educator, Dr. Friedrichs has had outstanding success in mentoring high school students, undergraduates and graduate students, excelled in teaching introductory and advanced graduate courses, and helped transform the curriculum of the School of Marine Science (SMS). As summarized by the SMS Faculty Status and Tenure Review Committee, "He is universally applauded as one of the most gifted educators and effective teachers within the SMS faculty." As a researcher, Dr. Friedrichs is at the forefront of discovery across the diverse fields of coastal geology, physical oceanography and benthic ecology, and is internationally recognized for his fundamental contributions. Although he has been a tenure-track faculty member for only 11 years, Dr. Friedrichs has authored or co-authored an impressive 63 peer-reviewed publications and has been the lead investigator at William & Mary on 21 federally-funded research grants totaling \$5.8 million.

Dr. Friedrichs has received numerous awards for his outstanding contributions to teaching and discovery, several of which have specifically highlighted his expertise in knowledge integration. As stated by the National Science Foundation (NSF), his prestigious CAREER Award explicitly recognizes "those teacher-scholars who most effectively integrate research and education within the context of the mission of their organizations." Dr. Friedrichs is also a recipient of the Presidential Early Career Award for Scientists and Engineers (PECASE) with a citation reading "For an exceptional approach to understanding sediment dynamics and its impact on marine ecology, and his extensive experience with mentoring programs for undergraduates and high school students." According to the White House press release, the PECASE is "the highest honor bestowed by the United States government on young professionals on the outset of their independent research careers." Finally, he has demonstrated outstanding and dedicated service to his university, to national and international advisory bodies, and to his local community.

Teaching

Dr. Friedrichs is a gifted and creative teacher and an experienced and highly effective mentor. He has had a significant impact on marine science education within the university and beyond, and he has been recognized for his contributions at the highest levels.

Dr. Friedrichs was recruited to teach at William & Mary's School of Marine Science/Virginia Institute of Marine Science (SMS/VIMS) as a Visiting Assistant Professor just a few months after completing his PhD when the previous instructor of Introduction to Physical Oceanography (a required class for all SMS students) took a sudden medical leave. Despite having only a few weeks to prepare, and having been trained mainly in geology rather than physics, Dr. Friedrichs gladly jumped at the chance. Dr. Friedrichs's class was an unqualified success, and the student course evaluations from his first semester speak for themselves: "Friedrichs is great. Make him permanent faculty." "For a first class at VIMS, Carl was super!" "Carl is an excellent teacher."

The following year, Dr. Friedrichs teamed with William & Mary biologist (and 2003 SCHEV Outstanding Faculty Award winner) Dr. Linda Schaffner to spearhead the development of a new interdisciplinary core course entitled "Coastal and Estuarine Processes and Issues". Regarding Dr. Friedrichs's contributions, his student course evaluations once more say it all: "One of the best instructors I have ever had!" "Carl has the unique talent of taking complex mathematical expressions and simplifying them into a form that is easily digestible." "His friendliness,

approachability, and talent for understanding student questions and answering them were exceptional." "Carl demonstrated unparalleled devotion to our class." Thanks in part to his great success with this new core course, Dr. Friedrichs was offered a tenure track position in 1996.

Kevin Goff, a Masters student who took "Coastal and Estuarine Processes and Issues" in 2000, writes "Marine science is an especially interdisciplinary science, requiring tight collaboration between physical, chemical, geological, and biological oceanographers in order to understand aquatic ecosystems. Dr. Friedrichs embraced that interdisciplinary spirit... He was always making connections and applications that wed the physical movements of the water to the geological setting and the living communities." Mr. Goff, who now teaches marine science at the Chesapeake Bay Governor's School, reports that he is presently incorporating material that Dr. Friedrichs taught him in "Coastal and Estuarine Processes and Issues" into a high school marine science text to be published by McGraw-Hill.

Dr. Friedrichs's numerous advanced courses also receive broad and enthusiastic praise, including Tidal Marsh Sedimentation ("It is a real pleasure to have a professor who clearly enjoys his subject, is enthused and treats students as peers."), Ocean Dynamics ("Great class, I wouldn't change a thing."), Boundary Layers & Sediment Transport ("The class was fantastic."), Coastal & Estuarine Physical Oceanography ("Carl did an outstanding job."), Morphodynamics of Deltas and Shelves ("Great class. Probably the most enjoyable I have taken."), and the Physical Sciences Seminar ("Carl does a fantastic job. His interest in all facets of marine research is highly contagious.")

Dr. Friedrichs's lecturing skills are in high demand beyond the School of Marine Science as well. Since coming to William & Mary, Dr. Friedrichs has given over 100 invited talks in other professors' classes, in prestigious short courses, at regional, national, and international workshops and conferences, and at departmental and institutional seminars across the U.S. and around the world. In 2007, for example, Dr. Friedrichs was a featured lecturer in a NSF-sponsored summer course at the Mexican Institute of Marine Science and Limnology.

In addition to his outstanding performance in the classroom and in lecture halls, the hallmark of Dr. Friedrichs's superior accomplishments in education may well be his success in mentoring. In his 11 years as a tenure-track professor, Dr. Friedrichs has already served as a major advisor to 16 graduate students. Among his five PhD students who have graduated to date (the remaining four are among his current students), four have positions as Assistant Professors (at Old Dominion Univ., the Univ. of Delaware, Florida Gulf Coast Univ., and Inha Univ., Korea), and the fifth is a researcher at Johns Hopkins. Of his seven Masters students, two are working on their theses, three continued on for PhDs, and two are instructors at community colleges.

Dr. Friedrichs's broad insights and ability to clearly explain complex physical processes has led to high demand for his service on student thesis and dissertation committees throughout the School of Marine Science and beyond. To date, he has served on 18 MS and 19 PhD advisory committees, including those of students from the State University of New York, the University of Maryland, the University of South Florida, and the University of Western Australia.

One of Dr. Friedrichs's most successful mentoring approaches has been to group students at multiple educational levels in small faculty-guided teams in order to foster the students' collaborative communication and research skills while simultaneously encouraging peer-based mentoring among students with diverse experiences. In 2000, Dr. Friedrichs established a new outreach and mentoring program entitled SEDIMENT (Science Education Inspired through MENToring). Through SEDIMENT, high school and undergraduate students pair with graduate

and faculty mentors in team research projects addressing interdisciplinary processes impacted by sediment dynamics, such as sedimentation in marshes or seabed mixing by benthic worms.

Since joining the School of Marine Science, Dr. Friedrichs has personally advised seventeen undergraduate and eight high school-aged researchers, even though the formal mission of the School of Marine Science more strongly emphasizes education at the graduate level. Many of Dr. Friedrichs's undergraduate interns have since gone on to graduate school in science. One of Dr. Friedrichs's first high school interns (co-mentored with Dr. Linda Schaffner) went on to undergraduate and graduate degrees in environmental science, was awarded prestigious graduate fellowships from both NSF and the Office of Naval Research, and, in 2006, was named one of the "Brilliant 10" by Popular Science.

Over the years, Dr. Friedrichs has received numerous awards and citations for his teaching and mentoring. In reference to his CAREER Award, NSF states: "The CAREER program recognizes and supports... those teacher-scholars who are most likely to become the academic leaders of the 21st century." His subsequent Presidential Award from Bill Clinton explicitly cites his work with undergraduates and high school students. In 2001, William & Mary awarded Dr. Friedrichs a prestigious four-year Distinguished Professorship to recognize his "reputation for excellence in scholarship and teaching". And in 2005, the College presented Dr. Friedrichs with the Alumni Fellowship Teaching Award "established to recognize younger members of the faculty who are particularly outstanding as teachers. It represents a fundamental commitment to honor faculty whose classroom work has already achieved notoriety among students, colleagues and staff."

Discovery

Dr. Friedrichs is a world-class scientist whose research has significantly advanced the fields of geological oceanography, physical oceanography and interdisciplinary marine science. As stated by Professor John Wells, the Dean of William & Mary's School of Marine Science, "Dr. Friedrichs possesses an unusual ability to work across the traditional disciplines of marine, earth, and environmental science. He combines this special ability with an impeccable level of rigor and lucid grasp of the first principles of the scientific fields involved -- particularly physical oceanography, sedimentary geology, sediment transport, coastal morphodynamics and marine ecology."

The breadth of topics covered by Dr. Friedrichs's five most frequently cited papers is remarkable. These five papers focus on: (1) marsh morphodynamics, (2) estuarine suspended particle properties, (3) wave-induced burial of seabed mines, and (4)/(5) transport of sediment across continental shelves. In oceanography, it is highly unusual for a scientist still in the first half of his career to be a leading expert on such diverse topics. More typically, a coastal scientist specializes on processes associated with just wetlands or just continental shelves or just physics or just ecology.

Here we briefly highlight two of the most influential lines of Dr. Friedrichs's research: marsh morphodynamics and continental shelf sediment transport. Marsh morphodynamics is the study of how the topography and vegetation of coastal wetlands respond to external pressures such as sea level rise and coastal development. Continental shelf sediment transport investigates how material eroded from the land and shore makes its way into the ocean and, ultimately, forms the deposits that create sedimentary rocks and that trap fossil fuels.

With respect to the first topic, Dr. Friedrichs's seminal 2001 article "Tidal salt marsh morphodynamics: a synthesis", has helped establish a new paradigm regarding the surprisingly

fast rate at which coastal wetlands respond to external environmental pressures. Coastal wetlands are fragile landscapes that are highly valuable to society due to their roles in protecting the shore from storm surges, filtering contaminants from runoff, and providing essential wildlife habitat. Professor Lynn Leonard, Director of the Coastal Hydrology and Sediment Dynamics Lab at the University of North Carolina-Wilmington, reports that she and her students light-heartedly refer to Dr. Friedrichs's 2001 paper as the "New Testament" because of the important influence it has had on updating the way coastal scientists view the dynamics of tidal marshes.

In a series of articles published since 2001, Dr. Friedrichs has also helped revolutionize oceanographers' understanding of continental shelf sediment transport. Dr. Friedrichs has helped establish a new paradigm regarding the key role of sediment "gravity flows" – akin to underwater avalanches – in moving sediment away from shore. These gravity flows can move much more sediment offshore than most other mechanisms, leading to more rapid formation of seabed deposits than previously thought possible. Dr. Friedrichs's novel ideas regarding the importance of sediment gravity flows have recently led to prestigious invited talks as part of the American Geophysical Union Chapman Conference series and in the Gordon Research Conference Frontiers of Science series.

Since arriving at William & Mary, Dr. Friedrichs's external funding has grown exponentially. His two largest lead-PI grants to date both began in 2006: A \$1.7 million award from the Office of Naval Research to develop real-time physical and chemical sensors for detecting hazards in the Chesapeake Bay and a \$1.9 million award from the National Science Foundation (NSF) to supplement this real-time observing system with acoustic and optical sensors for documenting interactions between sediment transport and estuarine organisms. Altogether, Dr. Friedrichs has received funding from 34 external grants and contracts, including grants from six separate NSF programs: Biological Oceanography, Environmental Biology, Marine Geology and Geophysics, Physical Oceanography, Ocean Sciences Education, and Ocean Technology!

The breadth of Dr. Friedrichs's research approach is equally impressive. As stated by University of Virginia Environmental Sciences Professor Patricia Wiberg, "There are relatively few marine scientists who are equally able to carry out field experiments, do innovative data analysis and develop numerical models. Carl is one of them." Dr. Friedrichs is equally at home trudging through marsh mud with undergraduates, lowering laser diffraction particle analyzers over the side of a research vessel with graduate students, and collaborating with other faculty to run the latest 3-D hydrodynamic models on supercomputers.

Dr. Friedrichs has received several prestigious awards in recognition of his research. In 2000, Dr. Friedrichs received the only Presidential Early Career Award ever received by a William & Mary faculty member. Other accolades recognizing his research include the NSF CAREER Award ("NSF's most prestigious award for new faculty members"), and a William & Mary Distinguished Professorship ("designed to recognize and reward excellence in research").

Integration of knowledge

Curricular development. Dr. Friedrichs's performance during his first year of teaching at William & Mary was so impressive that the following year he was asked to join a small team of School of Marine Science faculty to redesign the SMS core curriculum. The establishment of this new curriculum by Dr. Friedrichs and his SMS colleagues reflected a major shift occurring at the time in oceanography, from more narrowly focused, discipline-specific training towards a more integrated approach that applies a broad understanding of marine science to interdisciplinary problems. A major result of this reorganization was a new five-credit classroom and laboratory

course, required of all SMS students, entitled “Coastal and Estuarine Processes and Issues”, which Friedrichs has since taught ten times.

A main goal of the new core curriculum guided by Dr. Friedrichs was to encourage second semester students to integrate and apply the fundamental knowledge gained in their disciplinary first semester courses (i.e., biological, physical, geological, and chemical oceanography) to cross-cutting issues with societal relevance. Each year, “Coastal and Estuarine Processes and Issues” is centered around three pressing environmental issues which require a synthetic scientific approach, such as the degradation of coastal water quality, changing coastal land use, and over-exploitation of coastal fisheries.

Dr. Friedrichs’s advice continues to be in great demand in guiding curriculum development across the School of Marine Science. After helping redesign the SMS core courses in the mid-1990s, Dr. Friedrichs chaired the Education Strategic Planning Workgroup in preparation for the 2000 revision of the School of Marine Science’s Five Year Plan. Since 2004, Dr. Friedrichs has co-chaired the SMS Quantitative Skills Committee, which is charged with guiding the evolution of the SMS core course sequence in statistics, experimental design, and data analysis methods. Most recently, Dr. Friedrichs was appointed to 2007 VIMS Strategic Planning Steering Committee to help shepherd the evolving curriculum through the year 2010 and beyond.

Connections between teaching and discovery. Inquiry-based science learning that connects teaching and discovery is a hallmark of Dr. Friedrichs’s teaching and mentoring. “Coastal and Estuarine Processes and Issues,” the flagship introductory course he helped develop, utilizes integrative, experiential teaching techniques such as team-based research projects and hands-on experimentation to reinforce the lecture material. Dr. Friedrichs’s highly successful SEDIMENT mentoring program is literally founded on the concept of connecting discovery to teaching through experiential learning.

Integrative applications of Dr. Friedrichs’s own research have also provided excellent topics for more traditional lectures and discussions in introductory and advanced classes at William & Mary. His highly cited work on coastal wetlands, for example, has been featured in the SMS core courses, in classes at other universities, and is the centerpiece of Dr. Friedrichs’s well-received graduate course “Tidal Marsh Sedimentation”. His groundbreaking research on sediment gravity flows on continental shelves is central to his highly regarded class on “Morphodynamics of Deltas and Shelves” and is highlighted in the new graduate textbook “Continental Margin Sedimentation” (Nitttrouer et al., Blackwell Publishing, 2007).

The two most prestigious awards received by Dr. Friedrichs are specifically in recognition of his success in integrating research and education. As stated by NSF, the CAREER Award explicitly recognizes “those teacher-scholars who most effectively integrate research and education within the context of the mission of their organization.” Since “NSF selects nominees for the Presidential Early Career Awards for Scientists and Engineers (PECASE) from among the most meritorious new CAREER awardees”, PECASE Awards promoted through NSF are likewise limited to those who have demonstrated excellence in integrating research and education.

Service

International, National and Regional Scientific and Advisory Service. Dr. Friedrichs’s advice is in great demand for guiding the programmatic decisions of scientific societies, publishers, and international, national and regional research and management programs. Since joining the William & Mary faculty, Dr. Friedrichs has traveled to over 100 meetings of advisory committees,

panels, boards, workshops, and commissions. Some of his high profile appointments include the Editorial Board of the Elsevier journal *Continental Shelf Research* (since 1998), and the Scientific Steering Committee of the NSF Coastal Ocean Processes Program (since 2002).

To date, Dr. Friedrichs has completed over 270 proposal and manuscript peer-reviews for 57 separate journals, book series and funding programs. In 2003, Dr. Friedrichs co-chaired the NSF Benthic Exchange Dynamics Workshop and co-authored the resulting White Paper, which together have had a major influence on NSF funding priorities for interdisciplinary coastal oceanography. In 2007, Dr. Friedrichs chaired the Site Review Team that evaluated the initial performance of NSF's \$25 Million Center for Coastal Margin Observation and Prediction.

Service to the College of William & Mary/Virginia Institute of Marine Science (VIMS). Dr. Friedrichs has long been considered a valued colleague, mentor and confidant by his fellow faculty. As a reflection of this trust and respect, Dr. Friedrichs was elected his Department's Vice-Chair in 2005 – despite being the youngest member of his Department's 17 faculty members. Over the years, Dr. Friedrichs has served on numerous faculty search committees, and in 2006 he served on the evaluation committee for the William & Mary Vice Provost for Research. In 2007, the Dean of the SMS appointed Dr. Friedrichs to the newly established VIMS/SMS Strategic Planning Steering Committee.

In 2000, Dr. Friedrichs helped unite his diverse Department (which incorporates physical, geological and chemical oceanography) by establishing the first department-wide student and faculty seminar series, and he has continued to coordinate the Departmental Seminar Series during every subsequent semester. In addition, Dr. Friedrichs has represented his Department on the School of Marine Science's Academic Council and SMS Faculty Council; for the last seven years he chaired the Academic Council's Student Research Grant Committee; and for the last three years, he co-chaired the Academic Council's Quantitative Skills Committee.

Community Outreach. Over the last several years, Dr. Friedrichs has played a leading role in establishing and promoting outreach associated with the SMS/VIMS-Industry Partnership, an informal group of faculty and local business leaders striving to learn from each other and explore opportunities for collaboration in promoting local economic development. Via contacts initiated through the Industry Partnership, Dr. Friedrichs has begun collaborations with INCOGEN (based in Williamsburg) and Innovative Wireless Technologies (based in Lynchburg) to develop new hardware and software for ocean observing systems. This collaboration has already resulted in subcontracts to these local companies worth in excess of \$330,000.

One of Dr. Friedrichs's priorities in community outreach has been to strive to keep high school students interested in and excited about science by engaging them in marine science. Since joining William & Mary, Dr. Friedrichs has mentored eight high school students from the New Horizons Governor's School, the Chesapeake Bay Governor's School, and the Mentorship in Marine Science Governor's School. Every year for the last eight years, Dr. Friedrichs has also served as a moderator for the Blue Crab Bowl, a state-wide high school academic competition in marine science sponsored by the Consortium for Oceanographic Research and Education.

In addition, Dr. Friedrichs has found time to participate in several lines of community service unrelated to marine science. Over the years, for example, he has coached Little League baseball, youth soccer, and youth basketball, and he has regularly volunteered in support of other community groups, such as Cub Scouts and the PTA. In addition, he has served on his church's finance committee, taught Sunday school, volunteered for Habitat for Humanity, and joined his church's "NEST" team to provide meals and shelter to homeless adults.

Personal Statement of Carl T. Friedrichs

My career has been enriched by my ability to integrate research, education and service. If pressed, the distribution of my activities at William & Mary could arguably be estimated to be about 30% teaching/mentorship, 40% discovery, 15% knowledge integration and 15% service. However, a quantitative division is far from straightforward. Most of my group's research is made possible as a result of educating students -- eight of my last ten journal articles had students I had mentored as lead authors. Likewise, my lab's research helps drive the content of the classes that I teach. The relevance of my service to national boards and to university strategic planning similarly relies on a strong commitment to both research and education. Much of what I do (e.g., involving undergraduates in research, shepherding class research projects, guiding curricula for courses on data analysis) purposely crosses the boundaries of research and education.

My educational philosophy has been strongly shaped by childhood experiences, by my interactions with faculty and fellow students in college and graduate school, and by my continued work with students and faculty colleagues both inside and outside the College of William & Mary.

My father, who was a sociology professor at a small liberal arts college, shaped my view of college teaching at an early age. We lived in a house near the center of campus, and my father held many of his classes in our combined living room/dining room, where he'd lead discussions with his students from his easy chair. As I came in the door from school, I'd see the undergraduates spread out on our couches and dining room chairs in the midst of heated discussions with my father. To this day, I believe engaging and intense but informal interaction with students is the key that distinguishes truly successful teaching and mentoring from the routine instruction students could almost as easily gain from a series of video tapes.

Partly inspired by my father's approach, I chose to attend a predominantly undergraduate college, where professors put teaching first and classes were small. Our professors truly got to know us, they regularly invited us over to their houses, and we didn't hesitate to go to them for advice and guidance on concerns both academic and personal. They also involved us directly in their own research, taking us into the field locally, to the Rocky Mountains, and abroad. The year I graduated, there were only four geology majors, but the majority of us caught the academic bug -- three of us went on for PhDs, and we continue to keep in touch with each other and with our undergraduate professors to this day. My goal as a teacher and mentor ever since has been to emulate the generosity and attentiveness of the undergraduate professors that helped light such enthusiasm for science in me.

In graduate school at the Woods Hole Oceanographic Institution (WHOI), I continued to benefit from one-on-one interaction with my professors. My graduate advisor had a 100% open door policy -- he was always willing to drop what he was doing to address any question or concern I had, no matter how small. I follow the same policy -- my office door is never closed. I'd much rather help my students get back on track right now than wait until a formal weekly meeting to help them see that they may have wasted several days of work.

High quality classroom instruction was not a top priority for Woods Hole scientists, however, and the contrast in that regard with my undergraduate experience was notable. The disparity between research and teaching at WHOI inspired me to be active in student governance, and for four years I ran the institution's course evaluation system. The course evaluation system at WHOI was entirely student operated, and we chose to make the results from every course

available to all students and faculty. The constructive criticism I dealt out to the faculty while at WHOI was at times controversial. But I believe it contributed to an improvement in teaching at the institution during my time there, and it continued to make me strongly aware of teaching approaches that work (such as highlighting overarching themes) and those that don't work (such as just detailing one's most esoteric interests).

When I joined the faculty at the College of William & Mary, I was impressed with the balance the College achieves between the excellence in teaching I witnessed in my own undergraduate experience and the world-class research I was exposed to in graduate school. William & Mary is consistently ranked as the best small public university in the country – a testament to the university-wide value placed on teaching and mentoring, on small classes, and on developing one-on-one relationships between students and faculty. At the School of Marine Science (SMS), we rise to the high standards of the entire college, and excellence in teaching and mentoring plays a much larger role in annual evaluation and promotion than is common at most marine science institutions.

I love what I do, and I strive to ignite a similar enthusiasm in my students. Two of the activities of which I am most proud are triggering an excitement for interdisciplinary study in incoming classes of first-year marine science students and contributing to a passion for both teaching and research in the individual students I mentor. I am pleased to report that to date six of my graduate advisees have accepted faculty positions at colleges or universities.

Some of my most rewarding experiences in college and graduate school include the opportunities I had to tutor other students, help teach labs, be taught by older students in lab, and team with my fellow students in solving research problems. I established the SEDIMENT (Science Education Inspired through MENToring) program at William & Mary in large part to facilitate among physics and geology students at various stages of their education an appreciation for the advantages and insights to be gained from teamwork-based research and from teaching others. I also regularly provide extra research funds to my students so that they can modestly compensate other students who help them collect data in the field – thus encouraging the development of additional student-run collaborative teams.

Other experiences in college and graduate school that solidified my love of science included traveling to new field sites and conferences and working with and learning from other scientists from around the country and the world. Thus at William & Mary I strive to provide regular opportunities for my own students to travel and interact with researchers near and far. In the last few years, for example, my students have attended conferences and/or participated in fieldwork in Canada, France, Hawaii, Mexico, New Zealand, Puerto Rico, and the United Kingdom, as well as across the continental U.S.

I fondly recall the camaraderie that I shared in college and graduate school with my advisor and fellow students as we helped each other collect and interpret our data. Today I feel similar kinship in the field or in my lab when an undergraduate advisee and I leap across a tidal creek in a muddy marsh or when my graduate students and I celebrate getting a real-time wave sensor back “on-line” after it has mysteriously crashed. Basically, I strive to give my students opportunities for experiences similar to the best I had in college and graduate school that instilled within me with such devotion to teaching, mentorship and discovery.

Carl T. Friedrichs -- Abbreviated Curriculum Vitae

Education

Ph.D. 1993 M.I.T./Woods Hole Oceanographic Institution Joint Program, Oceanography
B.A. 1986 Summa Cum Laude, Amherst College, Geology

Academic Positions

2006- Professor, School of Marine Science, College of William and Mary
2001-2006 Associate Professor, School of Marine Science, College of William and Mary
1996-2001 Assistant Professor, School of Marine Science, College of William and Mary
1993-1996 Visiting Assistant Prof., School of Marine Science, College of William and Mary

Selected Honors

2005 College of William and Mary Alumni Fellowship Award for Teaching
2001-2004 Class of 1964 College of William and Mary Distinguished Professorship
2000 Presidential Early Career Award for Scientists and Engineers (PECASE)
2000 National Science Foundation Division of Ocean Sciences CAREER Award
1987 Awarded Office of Naval Research Graduate Fellowship

Courses Taught

Introduction to Physical Oceanography	Physical Sciences Seminar
Coastal & Estuarine Processes & Issues	Ocean Dynamics
Coastal & Estuarine Physical Oceanography	Tidal Marsh Sedimentation
Intro to Boundary Layers & Sediment Transport	Introduction to Fluid Mechanics
Tools for Geological & Physical Oceanography	Morphodynamics of Deltas & Shelves

Selected Publications (from 63 total peer-reviewed, Friedrichs's graduate students underlined)

Friedrichs, C.T., Scully, M.E., 2007. Modeling deposition by wave-supported gravity flows on the Po River prodelta: from seasonal floods to prograding clinofolds. *Continental Shelf Research*, 27: 322-337.

Scully, M.E., Friedrichs, C.T., 2007. Sediment pumping by tidal asymmetry in a partially-mixed estuary. *Journal of Geophysical Research*, 112, C07028, doi:10.1029/2006JC003784.

Scully, M.E., Friedrichs, C.T., 2007. The importance of tidal and lateral asymmetries in stratification to residual circulation in partially-mixed estuaries. *Journal of Physical Oceanography*, 37: 1496-1511.

Trembanis, A.C., Friedrichs, C.T., Richardson, M.D., Traykovski, P., Howd, P.A., Elmore, P.A., Wever, T., 2007. Predicting seabed burial of cylinders by wave-induced scour: application to the sandy inner shelf off Florida and Massachusetts. *IEEE Journal of Oceanic Engineering*, 32: 167-183.

Wright, L.D., Friedrichs, C.T., 2006. Gravity driven sediment transport on continental shelves: a status report. *Continental Shelf Research*, 26: 2092-2107.

Scully, M.E., C.T. Friedrichs, and J.M. Brubaker, 2005. Control of estuarine stratification and mixing by wind-induced straining of the estuarine density field. *Estuaries*, 28: 321-326.

Friedrichs, C.T., Wright, L.D., 2004. Gravity-driven sediment transport on the continental shelf: implications for equilibrium profiles near river mouths. *Coastal Engineering*, 51: 795-811.

Fugate, D.C., Friedrichs, C.T., 2003. Controls on suspended aggregate size in partially mixed estuaries. *Estuarine Coastal and Shelf Science*, 58: 1867-1886.

Friedrichs, C.T., and A. Valle-Levinson, editors, 2002. *Physics of Estuaries and Coastal Seas II*, *Continental Shelf Research*, Vol. 22, Nos. 18-19.

Fugate, D.C., Friedrichs, C.T., 2002. Determining concentration and fall velocity of estuarine particle populations using ADV, OBS and LISST. *Continental Shelf Research*, 22: 1867-86.

- Lee, G., C.T. Friedrichs, Vincent, C.E., 2002. Examination of diffusion versus advection dominated sediment suspension on the inner shelf under storm and swell conditions. *Journal of Geophysical Research*, 107 (C7): 21-1 - 21-22.
- Wright, L.D., C.T. Friedrichs, Scully, M.E., 2002. Pulsational gravity-driven sediment transport on two energetic shelves. *Continental Shelf Research*, 22: 2443-2460.
- Friedrichs, C.T., Perry, J.E., 2001. Tidal salt marsh morphodynamics. In: P. Goodwin and A.J. Mehta (eds.), *Tidal Wetlands: Physical and Ecological Processes*. *Journal of Coastal Research*, Special Issue No. 27, pp. 7-37.
- Friedrichs, C.T., Wright, L.D., Hepworth, D.A., Kim, S.C., 2000. Bottom boundary layer processes associated with fine sediment accumulation in coastal seas and bays. *Continental Shelf Research*, 20: 807-841.
- Friedrichs, C.T., Armbrust, B.A., de Swart, H.E., 1998. Hydrodynamics and equilibrium sediment dynamics of shallow, funnel-shaped tidal estuaries. In: J. Dronkers and M. Scheffers (eds.), *Physics of Estuaries and Coastal Seas*, Balkema Press, Rotterdam, p. 315-328.

- Selected External Funding** (from 21 grants/contracts with Friedrichs as lead investigator)
- Office of Naval Research, "Detection and prediction of hazards in ports, bays and the littoral zone: a lower Chesapeake Bay test bed" (2006-2007) \$1,724,000.
- National Science Foundation, "A real-time and rapid response observing system for the study of physical and biological controls on muddy seabed deposition, reworking and resuspension." (2006-2008) \$1,946,500.
- National Oceanic and Atmospheric Administration, "Chesapeake Bay observing cooperative expansion and integration demonstration: VIMS/CBNERRVA component" (2004-2006) \$111,099.
- US Army Corps of Engineers, "Development of a sediment transport model for the Chesapeake Bay: Supporting physical data" (2003-2006) \$248,619.
- National Science Foundation, "CAREER: Sediment dynamics of a microtidal partially-mixed estuary" (2000-2005) \$499,978.
- Office of Naval Research, "Integration of an analytical model for shelf sediment deposition into SEDFLUX" (2000-2002) \$99,790.

Selected Professional Service

NSF Science & Technology Center for Coastal Margin Observation & Prediction, Site Visit Review Team Chair (2007); Chesapeake Bay Observing System Steering Committee (2004-present); NSF Coastal Benthic Exchange Dynamics Workshop Co-Chair (2003-2004) American Geophysical Union Book Board (2002-present); NSF Coastal Ocean Processes Program Steering Committee (2002-present); Benthic Processes Expert Team, EPA Chesapeake Bay Modeling Program (2000-2002); NSF Division of Oceanography Review Panels (1998, 2000, 2002, 2005, 2007); Editorial Board, *Continental Shelf Research* (1998-present); International Steering Committee, *Physics of Estuaries & Coastal Seas Biennial Conference Series* (1998-present); American Society of Civil Engineers Task Committee on Physical Processes in Tidal Wetland Enhancement & Restoration (1994-2001)

Selected Academic Service

SMS/VIMS Strategic Planning Steering Committee (2007-present), Committee to Review the Vice Provost for Research (2006-2007), Physical Sciences Department Vice-Chair (2005-present), Chair of Academic Council Quantitative Skills Committee (2004-present), Industry Partnership Committee (2004-present), Analytical Services Center Advisory Committee (2004-present), Chair of Academic Council Student Research Grants Committee (2000-present), Faculty Search Committees (1995, 1997, 2000, 2007), Departmental Representative to Institutional Retreats (1996, 1998, 1999, 2005, 2006)

Letters of Support (Excerpted) for Carl T. Friedrichs

Students

"In 2000 Dr. Friedrichs was my physical oceanography professor... Although I was myself a student in the Fisheries Science program - a biologist, not a physicist - I loved his lectures... I found the physics so fascinating, in fact, that when it came time for us to design and conduct our own field studies, I adopted Dr. Friedrichs as my mentor and went for a physical oceanography study instead of a marine biology study... Dr. Friedrichs fully supported my idea, arranged the staff and vessel time, and got deeply involved in the project from front to back -- a great mentor!... I am now a teacher of marine and environmental science in a local magnet program for high ability high school students, and each year we enter a team in the Blue Crab Bowl at VIMS or ODU. This is a day-long academic competition that centers on marine science. Every year Dr. Friedrichs volunteers as a competition moderator, which he's very good at. And soon his reach will extend farther still. I have recently been contracted by McGraw-Hill to compose a textbook and curriculum for high school marine science courses. More than just a marine biology text, this will be a genuinely interdisciplinary approach to marine ecosystems, with plenty of good physical oceanography that I myself learned from a master teacher. The last chapter I wrote, for example, devoted a major section to the physics of estuarine circulation that Dr. Friedrichs taught me. And I think this amounts to the highest compliment I can pay a fellow educator: what I learned from Carl Friedrichs I now eagerly hope to pass on to another generation of young folks.

-- Kevin Goff, student in "*Estuarine and Coastal Processes and Issues*", MS degree 2002 from College of William & Mary, now science teacher at Chesapeake Bay Governor's School

"I had the great fortune of getting to know Carl as an advisor and mentor as an undergraduate student going through the scientific research process for the first time. He was constantly supportive and encouraging throughout the year that we worked on my research project... Carl's thorough knowledge of geology and coastal processes helped me understand the complicated processes we were dealing with, and he was always willing and able to explain those processes in terms that I could understand. Carl helped me develop an appreciation of the scientific research process through his exceptional abilities as a mentor, advisor, and teacher, and I feel so lucky to have been able to work with him."

-- Katherine Luciano, advised by Dr. Friedrichs for 2006-07 senior research project, now a graduate student in Environmental Science at the College of Charleston

"I discovered Carl's acumen in the classroom first through core courses and then through various advanced courses. No other instructor executed the true interdisciplinary nature of the VIMS educational mandate to the same advanced degree. I cannot over-emphasize the role that his guidance played in my growth as a student and a researcher. His proximity, enthusiasm for new discoveries, and constant open-door policy made him an easy and receptive target for stimulating, productive, and frequently humorous musings... Now finding myself in the position of instructor and mentor I have an even greater appreciation for how outstanding Carl is in these roles. I find myself frequently asking 'what would Carl do?' in a given instructional or mentoring challenge that I may be facing. I still keep very much in contact with Dr. Friedrichs and frequently call on his advice and mentorship to this day, and he remains willing and available to help -- something that speaks very much to his character as a person and his intrinsic qualities as an educator. He is truly deserving of that most hallowed and important of titles -- teacher."

-- Dr. Arthur Trembanis, completed PhD student with Dr. Friedrichs in 2004, now Assistant Professor in Department of Geology, University of Delaware

"I had the great pleasure of working with Dr. Carl Friedrichs as both an undergraduate and a graduate student. He is a great advisor, always willing to take time out of his very busy schedule to answer questions, review data, or discuss progress on a project. He is also very willing to provide the right tools for a research project... I truly appreciated this as I watched fellow graduate students become very frustrated as their advisors would take the "work with what you have, and make it work" stance. I also appreciated that Carl allowed me to work on my master's thesis work independently in many ways... Instead of feeling like I was doing his work, I felt as though I was more of a colleague."

-- Lynsey LeMay, completed MS with Dr. Friedrichs in 2007, now Instructor at Thomas Nelson Community College

"Carl's greatest strength as a scientist is his ability to distill complex processes down into the simplest and most meaningful terms... Carl's ability to understand and convey complex ideas in a straightforward manner also makes Carl an outstanding teacher... Carl was very aware that many of his students had diverse educational backgrounds and interests and always made an effort to ensure that material he presented was not only clear, but its broader relevance was always highlighted. As a student at VIMS, what impressed me most about Carl as an educator was the time he spent with students outside of the classroom... I personally interrupted Carl on a weekly, if not daily basis, with basic questions from both my research as well as my classes. Often I would go to Carl with questions from classes he was not teaching because I knew he would be happy to spend the time and answer my questions clearly."

-- Dr. Malcolm Scully, completed PhD with Dr. Friedrichs in 2005, now Assistant Professor in Ocean, Earth & Atmospheric Sciences Department at Old Dominion University (starting 1/1/08)

Faculty

"It is easy to string together superlatives when describing Carl because he has achieved excellence as a scientist, scholar, educator, mentor, public servant and colleague. I know from my many years of working with Carl as co-coordinator of the core course "Estuarine and Coastal Processes and Issues" that he does not compromise his standards of excellence in education when research demands mount. He has a rare ability to make even complex physics principles and equations accessible to non-specialists. He has worked hard to understand the biology and chemistry of coastal marine environments at an advanced level so that he can effectively motivate our students to learn the importance of physical processes for their own work."

-- Professor (and 2003 SCHEV Outstanding Faculty Award recipient) Linda Schaffner, Virginia Institute of Marine Science/School of Marine Science, College of William and Mary

"From listening to him present his work at numerous scientific meetings throughout the world, I can say that he is one of the most highly regarded and intellectually stimulating researchers in the fields of estuarine and shallow water oceanography. I believe him to be one of the leaders in the field of estuarine physical processes. What is particularly impressive is his ability to combine superb theoretical and mathematical skills with the planning and execution of field campaigns and the initiation of important experimental-instrumentation projects."

-- Professor Reginald Uncles, NERC Center for Coastal and Marine Sciences, Plymouth Marine Laboratory, United Kingdom

"Carl Friedrichs is a great scientist and wonderful teacher who is always willing to help out others. Each year, I've asked him to give a lecture about estuaries to my undergraduate Sedimentology course and, each time, his lecture is a model of clarity in addressing complex processes. He has a rare ability to explain highly quantitative topics in non-intimidating, conceptual terms. Carl has also generously given presentations based on his experience with the NSF CAREER program to an annual summer workshop I organize that brings 40-50 early

career geoscience faculty from across the country to William and Mary; his presentations to these young faculty have been extremely well received. He has also provided us copies of his successful grant proposals to add to our proposal collection, which is a great help to early career faculty. We are very fortunate to have Carl Friedrichs on the faculty at William and Mary. Finally, I think it is noteworthy that he acknowledged two faculty, both women, as his most important mentors at VIMS when he received his William and Mary Alumni Teaching Award, that 7 of his 16 his graduate students have been women, and that the majority of the William and Mary geology undergraduates that he has mentored have been women -- commendable statistics in a male-dominated field."

*-- Chancellor Professor (and 2003 SCHEV Outstanding Faculty Award)
Heather Macdonald, Chair, Department of Geology, College of William and Mary*

"In a word he is one of my most valued colleagues. His enthusiasm is infectious, and his productivity enviable. He is one of the leaders in the application of modern ideas about mixing and stratified turbulent processes in estuaries. Carl should also be acknowledged for his interdisciplinary and applied research contributions. He has had a long and productive collaboration with Linda Schaffner, studying the interactions between physics, sediment transport and benthic biology."

-- Dr. Rockwell Geyer, Senior Scientist and past Chair of Applied Ocean Physics & Engineering Department, Woods Hole Oceanographic Institution

"He is an outstandingly able and productive scientist. He has an enviable publication list, not just in quantity but also in the quality of his ideas and arguments. He has been particularly effective in developing innovative techniques for measuring the re-suspension and transport of fine sediments in estuaries and in establishing new insights into the control of these processes by turbulence. I know, from experience at VIMS, that he is widely respected and much valued as a teacher and supervisor of graduate students."

*-- Professor John Simpson, past Head of School of Ocean Sciences,
University of Wales, United Kingdom*

"Dr. Friedrichs is highly regarded by colleagues internationally and within the VIMS community. He excels at teaching, research, advisory service, and governance, having made significant contributions in each of these areas during his tenure at VIMS/SMS. His service on high-profile panels and national committees, such as the NSF Coastal Ocean Processes steering committee is evidence of his outstanding national reputation as a coastal physical oceanographer. His courses are overwhelmingly well-received by SMS graduate students and have strengthened the core and physical sciences educational programs. His graduate students have conducted excellent research, published their work in high quality peer-reviewed journals, and made significant career advances. Carl is an outstanding teacher and mentor with a strong commitment to higher education."

*-- Professor Rebecca Dickhut, Chair, Physical Sciences Department,
Virginia Institute of Marine Science/School of Marine Science, College of William and Mary*

"Dr. Friedrichs has excelled at both the national and international levels in two major areas of marine science: 1) coastal and estuarine physics which control sediment transport at time- and length-scales important to geology, biogeochemistry, and ecology; and 2) morphological controls on estuarine physical oceanography, boundary layer physics, sediment transport and sedimentation, estuarine morphodynamics, and interactions between sediment and biology. His success and productivity in the area of research are nothing short of spectacular."

*-- Professor Roger Mann, Director for Research and Advisory Services,
Virginia Institute of Marine Science/School of Marine Science, College of William and Mary*

Additional Documentation

Excerpts of letters of support from School of Marine Science Deans

Dr. Friedrichs possesses an unusual ability to work across the traditional disciplines of marine, earth, and environmental science. He combines this special ability with an impeccable level of rigor and lucid grasp of the first principles of the scientific fields involved -- particularly physical oceanography, sedimentary geology, sediment transport, coastal morphodynamics and marine ecology. Dr. Friedrichs has produced many seminal "cutting edge" research products. He is highly regarded by colleagues around the globe and within the VIMS community. One of the most challenging research areas for today's oceanographers is elucidating controlling factors and processes in the complex behavior of fine sediments in coastal systems. Dr. Friedrichs has been at the forefront of the field, both in terms of discovery and integration of knowledge...

Dr. Friedrichs has made significant and sustained contributions to the School of Marine Science academic program on the basis of teaching and mentoring efforts. He is universally applauded as one of the most gifted educators and effective teachers within the faculty. Dr. Friedrichs is an excellent communicator with an ability to make complex ideas and concepts understandable to students with minimal backgrounds in the subjects of physical and geological oceanography. He is also unusually altruistic and patient and these characteristics make him very effective in one-on-one mentoring of students. His lectures are always carefully prepared and skillfully presented. In short, he is an outstanding teacher with a strong commitment to higher education...

Dr. Friedrichs is one of the Institute's most gifted, talented and productive faculty members, teachers and researchers. Having him among our ranks enhances the standards and excellence of both the School of Marine Science/VIMS and the College of William and Mary. It is with enthusiasm and without reservation, that I forward the recommendation of Dr. Friedrichs for the 2008 Virginia Outstanding Faculty Award.

-- Professor John Wells, Dean and Director

Virginia Institute of Marine Science/School of Marine Science, College of William and Mary

Dr. Carl Friedrichs is one of our most talented and dedicated instructors. Given the size of his ambitious research program, his contributions to the educational program have been, in my opinion, remarkable. He excels as an instructor and mentor. For the period 2001 – 2007 the score for overall evaluations of instructor performance consistently ranged between 4 and 5 (on a scale of 1 to 5). Some examples of student comments are as follows: "Carl has an amazing grasp of his field. I enjoyed his presentation of the information." "Carl is one of the best teachers I have ever had (and I am not biased – I am not even in Physical Sciences)!" "Carl, you did an incredible job conveying this information. I really think you had a good understanding of what a student would grasp and how to effectively get your main points across."...

I have had the opportunity to closely observe Carl's mentoring abilities since he has served on several of my own students' advisory committees. I advise my students when appropriate to ask Carl to serve on their committees, since I know that Carl takes his role as advisor very seriously and is willing to provide expert help when needed... All in all I consider Carl to be one of our most altruistic faculty members, contributing in numerous ways to our educational program, while maintaining an excellent and highly productive research program.

-- Professor Iris Anderson, Dean of Graduate Studies

Virginia Institute of Marine Science/School of Marine Science, College of William and Mary

Student Course Evaluations of Classes Taught by Carl T. Friedrichs

All available scores for “overall evaluation of this instructor” for courses taught by Dr. Friedrichs with three or more completed student evaluations (on a scale of 1 to 5). If a course has been taught more than once by Dr. Friedrichs, the mean and median are for all years combined.

Course Number	Course Title	Mean	Median
MS 501	Introduction to Physical Oceanography	5.0	5
MS 502	Coastal & Estuarine Processes & Issues	4.3	4
MS 520	Introduction to Fluid Mechanics	4.8	5
MS 520	Coastal & Estuarine Physical Oceanography (revised title)	4.5	4/5
MS 553	Introduction to Boundary Layers & Sediment Transport	4.7	5
MS 601	Physical Sciences Department Seminar	4.9	5
MS 613	Ocean Dynamics	4.7	5
MS 621	Morphodynamics of Deltas and Shelves	4.7	5
MS 698	Tidal Salt Marsh Sedimentation	4.8	5

Verbatim examples of student evaluation comments not included elsewhere in this package:

- “Dr. Friedrichs is one of the best professors I have ever had.”
- “The reason 502 was so good was because he put so much effort into bringing it all together.”
- “I enjoyed your lectures tremendously. I now understand physical oceanography like I never had before. Keep it up, Carl.”
- “Carl is an excellent teacher. I was most impressed by the care he showed towards the students.”
- “Great job. It’s evident that you care about the students in this course.”
- “Carl’s understanding and ability to explain sometimes complex mathematics is seconded only by his great enthusiasm for what he is teaching.”
- “Wow! Carl is just brilliant. His lecture style is fantastic. You can really sense the love for the information he is teaching and his enthusiasm is contagious.”
- “The organization of the lectures is fantastic! It really helps when learning a new, complex topic.”
- “Very well taught course. In particular, the instructor did a very effective job of integrating the various physical, biological and chemical elements.”
- “Dr. Friedrichs seemed very interested in making sure concepts were presented clearly. He made physical oceanography more accessible to people without extensive physical science backgrounds.”
- “He made physics understandable and fun!”
- “Dr. Friedrichs was an outstanding instructor.”
- “Awesome visuals and handouts. Explains tough physical processes thoroughly but basically so that they can be understood and applied to the ‘big’ picture.”
- “Excellent presentation of the material.”
- “One of the best things about Carl is his unfailing courtesy and approachability. One can collar him at any hour and he will patiently explain an opaque concept until it becomes clear.”
- “Physics was presented in a very non-scary manner.”
- “Awesome way to explain physical oceanography theory. I learned a lot.”
- “Yay! I finally understand physical oceanography. Carl did an excellent job of explaining these processes in a logical, non-math way.”
- “Carl’s enthusiasm for the material is always inspiring.”
- “Carl did an outstanding job teaching the material. I was especially pleased with the way he integrated the physical oceanography into the other disciplines.”

Graduate and Undergraduate Students Advised by Carl T. Friedrichs

Dr. Friedrichs has advised 17 undergraduates (on internships or senior research projects), 7 MS, and 9 PhD students. 7 of his undergraduate advisees have gone on to graduate school in environmental science. All of his graduate students have stayed in academics or research, and 7 of his advisees have become high school, community college or university teachers.

Ph.D. students advised by Carl Friedrichs (Year graduated, Name, Present title)

2010*	Grace Cartwright	Marine Science Technician, Virginia Institute of Marine Science
2010*	Lindsey Kraatz	Ph.D. Graduate Research Assistant, College of William & Mary
2009*	Peony Ma	Ph.D. Graduate Research Assistant, College of William & Mary
2008*	Jarrell Smith	Research Hydraulic Engineer, US Army Corps, Vicksburg, MS
2005	Malcolm Scully	Assistant Professor, Old Dominion University (starting 1/1/08)
2004	Arthur Trembanis	Assistant Professor, University of Delaware
2002	David Fugate	Assistant Professor, Florida Gulf Coast University
2000	Guan-hong Lee	Assistant Professor, Inha University, Korea
1996	Linda Frizzell	Principal Oceanographer, Johns Hopkins University

*expected

M.S. students advised by Carl Friedrichs (Year graduated, Name, Present title)

2008*	Joshua Bearman	M.S. Graduate Research Assistant, College of William & Mary
2008*	Patrick Dickhudt	M.S. Graduate Research Assistant, College of William & Mary
2007	Lynsey LeMay	Instructor, Thomas Nelson Community College
2004	Heidi Romine	Ph.D. Graduate Research Assistant, College of William & Mary
2001	Malcolm Scully	Assistant Professor, Old Dominion University (starting 1/1/08)
2000	Grace Cartwright	Marine Science Technician, Virginia Institute of Marine Science
1996**	Bruce Armbrust	Instructor, Lake Tahoe Community College

*expected, **transferred

Undergraduate students advised by Carl Friedrichs (Year, Name, College, Present title)

2007-08	Sam Bruno	William & Mary, Undergraduate in Geology Dept.
2006	Emilee Mroz	St. Lawrence U., Intern at Washington State Dept. of Ecology
2006-07	Katherine Luciano*	William & Mary, Environ. Science MS student at Coastal Carolina
2005	Andrew Kowalczk*	Texas A&M, Oceanography MS Student at Florida State Univ.
2004	Joseph Levitt	Tulane, Tech at Clean Harbors Environ. Services, Portland, ME
2003-04	Macdonald Lee	William & Mary, Marine Sci. Tech at Virginia Commonwealth Univ.
2002-03	Rebecca Roper	William & Mary, Science Teacher at Clarke County High, VA
2001-02	Lynsey LeMay*	William & Mary, Instructor at Thomas Nelson Community College
2001	Brian Zelenke*	Humboldt State U., Marine Sci. Tech at California Polytech. Univ.
2001	Brian Schott	Randolph-Macon, Safety Specialist at Johns Hopkins Univ.
2000-01	Carrie Snyder*	William & Mary, Oceanography MS Student at Old Dominion U.
1999-00	Michelle Venanzi	William & Mary, Systems engineer Metron Aviation, Herndon, VA
1999	Selma Houwelingen*	Utrecht Univ., Lecturer in Geography at Univ. of Chester, U.K.
1999	Manon Rommens	Utrecht Univ., no contact information
1997	Stefan Petranek	Bowdoin College, MFA student at Rochester Inst. of Technology
1997	Arno de Kruijf*	Utrecht Univ., Scientist at Coastal Management Inst., Netherlands
1997	Daan Rijks	Utrecht Univ., Consultant at DHV Engineering, Netherlands

*went on to graduate school in environmental science

Examples of Invited Talks (of 125 Total) by Carl T. Friedrichs

Title	Sponsor	Location	Date
Tides in Estuaries	National Science Foundation Pan-American Advanced Studies Institute	Puerto Morelos, Mexico	08/03/07
Challenges in Modeling Fine Sediment Transport	Frontiers of Science Gordon Research Conference on Coastal Ocean Modeling	New London, New Hampshire	07/21/07
VECOS: the Virginia Estuarine and Coastal Observing System	University of Delaware Geology Department Seminar Series	Newark, Delaware	05/04/06
Equilibrium Response of Subaqueous Deltas to Waves	Office of Naval Research EuroSTRATAFORM-PROMESS Joint Meeting	Salamanca, Spain	09/29/05
Predicting Mine Scour Burial	Office of Naval Research Mine Burial Workshop	Kailua-Kona, Hawaii	02/01/05
My NSF CAREER Award Experience	National Assoc. of Geoscience Teachers Early Career Faculty Workshop	Williamsburg, Virginia	06/15/04
Sediment Gravity Flows	Duke University Division of Earth and Ocean Sciences Seminar Series	Durham, North Carolina	08/29/03
Barotropic Estuarine Tides	University of Washington Estuarine and Coastal Fluid Dynamics Summer School	Friday Harbor, Washington	07/18/03
Particle Aggregation Dynamics in Partially Mixed Estuaries	Rutgers University Institute of Marine and Coastal Sciences Seminar Series	New Brunswick, New Jersey	11/25/02
Simple Models for Energetic Shelf Sediment Transport	Office of Naval Research EuroSTRATAFORM Program Meeting	Winchester, United Kingdom	11/08/02
Fate of Fine Sediment on Energetic Depositional Shelves	American Geophysical Union Chapman Conference on Sedimentary Strata on Continental Shelves	Ponce, Puerto Rico	06/17/01
Tidal Salt Marsh Dynamics	Woods Hole Oceanographic Institution Coastal Morphodynamics Symposium	Woods Hole, Massachusetts	04/25/00
Sediment Dynamics of a Microtidal Partially-Mixed Estuary	University of South Carolina Department of Geological Sciences Seminar Series	Columbia, South Carolina	11/15/99
Applications of New Instrumentation for Sediment Transport	University of Maryland Center for Environmental Science Seminar Series	Cambridge, Maryland	05/05/99
Linkages to the Offshore	Office of Naval Research Nearshore Community Workshop	St. Petersburg, Florida	10/27/98
Hydrodynamics and Sediment Dynamics of Tidal Estuaries	Duke University Division of Earth and Ocean Sciences Seminar Series	Durham, North Carolina	04/30/97
Sediment Transport on the Inner Shelf of the Mid-Atlantic Bight	State University of New York Marine Sciences Research Center Seminar Series	Stony Brook, New York	04/29/96
Hydrodynamics and Morphodynamics of Tidal Channels	Utrecht University Institute for Marine and Atmospheric Research Seminar Series	Utrecht, The Netherlands	05/23/95