

**RICHARD CARL ZIMMERMAN**  
Department of Ocean, Earth & Atmospheric Sciences  
Old Dominion University, Norfolk VA 23529

**EDUCATION**

- Ph.D. Biological Sciences, University of Southern California (USC). 1983. Dissertation Title: Seasonal Patterns in the Productivity of a Giant Kelp (*Macrocystis pyrifera*) Forest: The Effect of Nutrient Availability. (Dr. James N. Kremer, Supervisor)
- M.S. Biological Sciences, USC, 1979. Thesis Title: Structure of Algal Associated Gammaridean Amphipod Communities in Selected Temperate (California) and Subtropical (Mexico) Habitats. (Dr. Richard C. Brusca, Supervisor)
- B.S. Biological Sciences, USC. Graduated cum laude, 1975.

**HONORS**

- Elected to Sigma Xi 1981  
A.R.C.S. Scholar 1981-1983  
Visiting Professor, Moss Landing Marine Laboratories, 1998-1999  
Elected to Phi Kappa Phi 2007

**POSITIONS HELD**

- 2003- present Professor and Chair, Dept. Ocean, Earth & Atmospheric Sciences, Old Dominion University, Norfolk, VA
- 1999-2003 Adjunct Professor, Moss Landing Marine Laboratories
- 1997- 2001 Vice-President and Senior Scientist, HOBI Labs, Inc., Marina, CA
- 1996- 2003 Associate Research Scientist, San Jose State University Foundation, Moss Landing Marine Laboratories, Moss Landing CA
- 1992-1996 Asst. Research Scientist, Dept. Biology, UCLA
- 1987-1992 Research Associate (Instructor), Dept. Molecular Genetics & Cell Biology, University of Chicago.
- 1986-1987 Postdoctoral Research Associate, Dept. Molecular Genetics & Cell Biology, University of Chicago.
- 1986 Instructor, Biology Dept., California State University, Long Beach.
- 1983-1986 Postdoctoral Research Associate, Allan Hancock Foundation, USC.
- 1982 Research Assistant, Allan Hancock Foundation, USC.
- 1976-1981 Teaching Assistant, Department of Biological Sciences, USC
- 1977-1978 Asst. Investigator, Allan Hancock Foundation, USC.
- 1975-1976 Asst. Marine Scientist, Allan Hancock Foundation, USC.

**RESEARCH INTERESTS**

Ecological physiology of marine photosynthesis, metabolic regulation of carbon and nutrient dynamics in marine ecosystems, radiative transfer and remote sensing of optically

shallow waters, ecosystem productivity and numerical modeling.

## PEER REVIEWED PUBLICATIONS

- Hammer, R. M. and R. C. Zimmerman. 1979. Species of demersal zooplankton inhabiting a kelp forest ecosystem off Santa Catalina Island, California. *Bull. So. Calif. Acad. Sci.* 78(3):199-206.
- Zimmerman, R. C. and J. N. Kremer. 1984. Episodic nutrient supply to a kelp forest ecosystem in southern California. *J. Mar. Res.* 42(3):591-604.
- North, W. J. and R. C. Zimmerman. 1984. Influence of macronutrients and water temperatures on summertime survival of *Macrocystis* canopies. *Hydrobiologia* 116/117:419-424.
- Zimmerman, R. C. and D. L. Robertson. 1985. Effects of El Niño on local hydrography and growth of the giant kelp, *Macrocystis pyrifera*, at Santa Catalina Island, California. *Limnol. Oceanogr.* 30(6):1298-1302.
- Zimmerman, R. C. and J. N. Kremer. 1986. *In situ* growth and chemical composition of the giant kelp, *Macrocystis pyrifera*: response to temporal changes in ambient nutrient availability. *Mar. Ecol. Prog. Ser.* 27:277-285.
- Zimmerman, R. C., J. N. Kremer, and R. C. Dugdale. 1987. Modeling acceleration of nutrient uptake by phytoplankton in a coastal upwelling ecosystem. *Limnol. Oceanogr.* 32: 359-367.
- Zimmerman, R. C., J. B. Soohoo, J. N. Kremer and D. Z. D'Argenio. 1987. An evaluation of variance approximation techniques for non-linear photosynthesis-irradiance models. *Mar. Biol.* 95:209-215.
- Zimmerman, R. C., R. D. Smith and R. S. Alberte. 1987. Is growth of eelgrass nitrogen-limited? A modeling analysis of the effects of light and nitrogen on the growth dynamics of *Zostera marina*. *Mar. Ecol. Prog. Ser.* 41:167-176.
- Zimmerman, R. C., R. D. Smith and R. S. Alberte. 1989. Thermal acclimation and whole plant carbon balance in *Zostera marina* L. (eelgrass). *J. Exp. Mar. Biol. Ecol.* 130:93-109.
- Zimmerman, R. C., J. L. Reguzzoni, S. Wyllie-Echeverria, M. Josselyn and R. S. Alberte. 1991. Assessment of environmental suitability for growth of *Zostera marina* L. (eelgrass) in San Francisco Bay. *Aquat. Bot.* 39:345-352.
- Kopczak, C. D., R. C. Zimmerman and J. N. Kremer. 1991. Variation in nitrogen physiology and growth among geographically isolated populations of the giant kelp, *Macrocystis pyrifera* (Phaeophyta). *J. Phycol.* 27:149-158.
- Coyer, J.A., J.M. Engle and R.C. Zimmerman. 1992. Discovery of a fertile *Pelagophycus* x *Macrocystis* (Phaeophyta) hybrid and subsequent production of F<sub>2</sub> sporophytes in laboratory culture. *J. Phycol.* 28:127-130.
- Smith, G.J., R.C. Zimmerman and R.S. Alberte. 1992. Molecular and physiological responses of diatoms to variable levels of irradiance and nitrogen availability. I. Growth of *Skeletonema costatum* in simulated upwelling conditions. *Limnol. Oceanogr.* 37:989-1007.
- Todd, J.T., R.C. Zimmerman, P. Crews and R. S. Alberte. 1993. Isolation of p-sulfoxy cinnamic acid from *Zostera marina* L. (eelgrass) and the antifouling activity of phenolic acid sulfate esters. *Phytochemistry*, 34:401-404.
- Alberte, R.S., G.K. Suba, G. Procaccini, R.C. Zimmerman and S.R. Fain. 1994. Assessment of genetic diversity of seagrass populations using DNA fingerprinting: Implications for population stability and management. *Proc. Nat. Acad. Sci* 91:1049-1053.

- Zimmerman, R.C., A. Cabello-Passini and R.S. Alberte. 1994. Modeling daily production of aquatic macrophytes from irradiance measurements: a comparative analysis. *Mar. Ecol. Prog. Ser.* 114:185-196.
- Zimmerman R.C., J.R. Reguzzoni, and R.S. Alberte. 1995. Role of light availability on growth and metabolism of eelgrass (*Zostera marina* L.) transplants in San Francisco Bay. *Aquat. Bot.* 51:67-86
- Zimmerman, R.C., D.G. Kohrs, D.L. Steller and R.S. Alberte. 1995. Carbon partitioning in the seagrass *Zostera marina* L.: Regulation by photosynthesis and the role of daily light-dark cycles. *Plant Physiol.* 108:1667-1671
- Zimmerman, R.C. and R.S. Alberte. 1996. Effect of light/dark transition on carbon translocation in eelgrass (*Zostera marina* L) seedlings. *Mar. Ecol. Prog. Ser.* 136:305-309
- Clendennen, S.K., R.C. Zimmerman, R.S. Alberte and D.A. Powers. 1996. The photosynthetic response of the giant kelp, *Macrocystis pyrifera* (Laminariales, Phaeophyta) to UVB radiation. *J. Phycol.* 32:614-620.
- Zimmerman, R.C., D.G. Kohrs and R.S. Alberte 1996. Top-down impact through a bottom-up mechanism: the effect of limpet grazing on growth, productivity and carbon allocation of *Zostera marina* L. (eelgrass). *Oecol.* 107:560-567.
- Zimmerman, R.C. and C.D. Mobley. 1997. Radiative transfer within seagrass canopies: impact on carbon budgets and light requirements. *Proceedings Ocean Optics XIII. SPIE* 2936:331-336.
- Zimmerman, R.C., D.G. Kohrs, D.L. Steller, and R.S. Alberte. 1997. Impacts of CO<sub>2</sub>-enrichment on productivity and light requirements of eelgrass. *Plant Physiol.* 115:599-607.
- Sundberg, D.C., R.C. Zimmerman and C.M. Smith. 1997. Selection, design and delivery of environmentally benign antifouling agents. *Nav. Res. Rev.* XLIX: 51-59.
- Alcoverro, T., R.C. Zimmerman, D.G. Kohrs, R.S. Alberte. 1999. Resource allocation and sucrose mobilization in light-limited eelgrass (*Zostera marina* L.). *Mar. Ecol. Prog. Ser.* 187:121-131
- Jochem, F.J., G.J. Smith, Y. Gao, R.C. Zimmerman, A. Cabello-Pasini, D.G. Kohrs, R.S. Alberte. 2000. Cytometric quantification of nitrate reductase by immunolabeling in the marine diatom *Skeletonema costatum*. *Cytometry* 39:173-178
- Swain, G Anil, AC, Baier, RE, Chia, F, Conte, E, Cook, A, Hadfield, M, Haslbeck, L, Holm, E, Kavanagh, C, Kohrs, D, Kovach, B, Lee, C, Mazzella, L, Meyer, A, Qian, P, Sawant, SS, Schultz, M, Sigurdsson, J, Smith, C, Soo, L, Terlizzi, A, Wagh, A, Zimmerman, R, Zupo, V. 2000. Biofouling and barnacle adhesion data for fouling-release coatings subjected to static immersion at seven marine sites. *Biofouling*, **16**: 331-344.
- Van Duin, E.H.S., G. Blom, F.J. Los, R. Maffione, R. Zimmerman, C.F. Cerco, M. Dortch, E. P.H. Best. 2001. Modeling underwater light climate in relation to sedimentation, resuspension, water quality and autotrophic growth. *Hydrobiol.* 444:25-42.
- Invers, O, R.C. Zimmerman, R.S. Alberte, M. Pérez, J. Romero. 2001. Inorganic carbon sources for seagrass photosynthesis: an experimental evaluation of bicarbonate use in temperate species. *J. Exp. Mar. Bio. Ecol.* 265:203-217.
- Zimmerman, R.C., D.L. Steller, D.G. Kohrs and R.S. Alberte. 2001. Top-down impact through a bottom-up mechanism : *in situ* effects of limpet grazing on growth, light requirements and survival of *Zostera marina* L. (eelgrass). *Mar Ecol. Prog. Ser.* 218. 127-140.

- Cabello-Pasini, A., C. Lara-Turent, R. C. Zimmerman. 2002. Photosynthesis, carbohydrate content and survival of eelgrass populations in a coastal lagoon and the adjacent open sea. *Aquat. Bot.* 74: 149-164.
- Burdige, D.G., R.C. Zimmerman. 2002. Impact of seagrass density on carbonate dissolution in Bahamian sediments. *Limnol. Oceanogr.* 47: 1751-1763.
- Fuchs, E., R. C. Zimmerman, J.S. Jaffe. 2002. The effect of elevated levels of phaeophytin in natural water on variable fluorescence emission by phytoplankton. *J. Plankton Res.* 24:1221-1229.
- Dierssen, H.M., R.C. Zimmerman, R.A. Leathers, T.V. Downes, C.O. Davis. 2003. Remote sensing of seagrass and bathymetry in the Bahamas Banks using high resolution airborne imagery. *Limnol. Oceanogr.* 48: 444-455
- Drake, L. A., F. C. Dobbs, R.C. Zimmerman. 2003. Effects of epiphyte load on optical properties and photosynthetic potential of the seagrasses *Thalassia testudinum* König and *Zostera marina* L. *Limnol. Oceanogr.* 48: 456-463.
- Zimmerman, R.C. 2003. A bio-optical model of irradiance distribution and photosynthesis in seagrass canopies. *Limnol. Oceanogr.* 48: 568-585.
- Cummings, M.E., R. C. Zimmerman. 2003. Light harvesting and the package effect in the seagrasses *Thalassia testudinum* König and *Zostera marina* L.: optical constraints on photoacclimation. *Aquat. Bot.* 75: 261-274.
- Dobbs, F.C., R.C. Zimmerman, L.A. Drake. 2004. Widespread occurrence of previously unreported intracellular crystals in *Thalassia testudinum* (Banks ex König). *Aquat Bot.* 80:23-28.
- Dominik, C.M. and R.C. Zimmerman. 2006. Dynamics of carbon allocation in a deep-water population of the deciduous kelp, *Pleurophycus gardeneri*. *Mar. Ecol. Prog. Ser.* 309:143-157.
- Dierssen, H., R. Kudela, J. Ryan and R. Zimmerman. 2006. Red and black tides: Quantitative analysis of sea spectral reflectance and perceived color for phytoplankton, colored dissolved organic matter, and suspended sediments. *Limnol. Oceanogr.*, 51: 2646-2659.
- Palacios, S.L. and R.C. Zimmerman. 2007. Eelgrass (*Zostera marina* L.) response to CO<sub>2</sub> enrichment: possible impacts of climate change and potential for remediation of coastal habitats. *Mar. Ecol. Prog. Ser.* 344: 1 – 13.
- Burdige, D., R.C. Zimmerman, and X. Hu. 2008. Rates of carbonate dissolution in permeable sediments estimated from pore-water profiles: The role of sea grasses. *Limnol. Oceanogr.* **53**: 549-565.
- Rassweiler, A., K. Arkema, D. Reed, R. Zimmerman, and M. Brzezinski. 2008. Net primary production, growth and standing crop of *Macrocystis pyrifera* in Southern California. *Ecological Archives* **In press**.

## **PATENTS AND COMPUTER SOFTWARE COPYRIGHTS**

- Zimmerman, R.C. and J.N Kremer. 1982. CRUNCH, a data analysis and statistical package for CP/M computers.
- Zimmerman, R.C. 1993. SIM, a program for analyzing genetic similarities from DNA fingerprint data, for MS-DOS computers. Regents of the University of California.

- Zimmerman, R.C., R.S. Alberte, J. Todd and P. Crews. 1994. Phenolic acid sulfate esters for prevention of marine biofouling. U.S. Pat. No. 5,384,176.
- Alberte, R.S. and Zimmerman, R.C. 1999. Improved Antifouling Compounds and Uses Thereof. U.S. Patent Application No. 09/406,184; WO 00/16623
- Alberte, R.S. and Zimmerman, R.C. 1999. Methods and Compositions for Treating Receptor Mediated Diseases. U.S. Patent Application No. 09/604,852; WO 00/16764
- Zimmerman, R.C. 2001. GrassLight, a biophysical simulation model of submerged aquatic vegetation.
- Alberte, R.S. and Zimmerman, R.C. 2006. Environmentally Benign Crop Protection Agents. U.S. Patent No. 11/475,833
- Alberte, R.S. and Zimmerman, R.C. 2006. Safe and Effective Biofilm Inhibitory Compounds and Health-Related Uses Thereof. U.S. Patent No 11/475,548

## **TECHNICAL REPORTS, SYMPOSIA, BOOK CHAPTERS AND REVIEWS**

- Brusca, R. C. and R. C. Zimmerman. 1979. Irvine Coast Marine Life Refuge, Orange County. Calif. Mar. Waters - Areas of Special Biological Significance, Recon. Survey Rept. 79-3:1-30.
- Zimmerman, R. C. 1983. Modeling Kelp Growth. pp. 233-242 In W. J. Bascom (ed.) The Effects of Waste Discharge on Kelp Communities. SCCWRP. Long Beach, CA.
- Zimmerman, R. C., R. D. Smith and R. S. Alberte. 1990. Seagrass revegetation: developing a predictive model of light requirements for *Zostera marina*. Pp. 6-12 in K. Merkel (ed.), Proc. 2nd Calif. Eelgrass Symp., Sweetwater River Press, National City, California.
- Zimmerman, R.C. & R.S. Alberte 1991. Prediction of light requirements for eelgrass (*Zostera marina* L.) growth from numerical models. Pp. 25-36 in J. Kenworthy & D. Haunert (eds), Results and recommendations of a workshop convened to examine the capability of water quality criteria, standards and monitoring programs to protect seagrass from deterioration in water transparency. Coastal Ocean Program Estuarine Habitat Studies, NOAA, Washington, D.C.
- Alberte, R.S. and R.C. Zimmerman. 1991. Exploitation of ecological growth models for management of seagrass resources. In O. Magoon (ed) Proc. 7th Symposium on Coastal & Ocean Management.
- Zimmerman, R.C., A. Cabello-Passini and R.S. Alberte. 1993. Modeling daily carbon gain of aquatic macrophytes from quantum flux measurements: A comparative analysis. pp. 169-195 in L.J. Morris and D.A. Tomasko (eds), Proceedings and conclusions of workshops on: Submerged aquatic vegetation initiative and photosynthetically active radiation. Special Publication SJ93-SP13. St. John's River Water Mgmt. Dist., Palatka FL.
- Zinn, M., R. Zimmerman, and D. White. 2000. Environmentally acceptable control of microbial biofilms. Pages 361-380 in L. V. Evans, editor. Biofilms: recent advances in their study and control. CRC Press, Boca Raton, FL.
- Zimmerman, R.C. 2001. A biophysical model evaluation of eelgrass distribution and habitat potential in Dumas Bay, WA. 25 pp. In Norris, J., S. Wyllie-Echeverria, J. Skalski and R. Zimmerman. 2001. Washington State Department of Natural Resources Submerged Vegetation Monitoring Project 2000 Final Report. Olympia, WA

- Burdige, D.J., Zimmerman, R.C. 2002. Shallow water carbonate sediment-seagrass interactions and their impact on atmospheric CO<sub>2</sub>. 14 pp. In Isobe, M. and Kraines, S. (eds), International Workshop for the SEECs (Seagrass Ecosystem Ecoengineering and Carbon Sequestration) Project. Graduate School of Frontier Science, University of Tokyo, Japan.
- Zimmerman, R.C. and Palacios, S.L. 2002. Stimulating eelgrass production with industrial flue gas: Eco-engineering for habitat remediation and purposeful carbon storage. 25 pp. In Isobe, M. and Kraines, S. (eds), International Workshop for the SEECs (Seagrass Ecosystem Ecoengineering and Carbon Sequestration) Project. Graduate School of Frontier Science, University of Tokyo, Japan.
- Zimmerman, R.C. Caffery, J. 2002. Chapter 8. Primary Producers. In J. Caffrey, M. Brown, W.B. Tyler and M. Silberstein (eds) Changes in a California Estuary. A Profile of Elkhorn Slough. Elkhorn Slough Foundation, Moss Landing, California ([www.elkhornslough.org](http://www.elkhornslough.org)).
- Berry, H., Sewell, A., Wyllie-Echeverria, S., Reeves, B., Mumford, T., Skalski, J.R., Zimmerman, R.C., Archer, J. 2003. Puget Sound Submerged Vegetation Monitoring Project. 2000 – 2002 Monitoring Report. Aquatic Resources Division, Washington State Department of Natural Resources, Olympia, Washington
- Zimmerman, R., 2006. Chapter 13. Light and photosynthesis in seagrass meadows. In: A. Larkum, C. Duarte and R. Orth (Editors), Seagrasses: Biology, Ecology and Conservation. Springer, Dordrecht, pp. 303-321.
- Zimmerman, R. and Dekker, A., 2006. Chapter 12. Aquatic optics: basic concepts for understanding how light affects seagrasses and makes them measurable from space. In: A. Larkum, R. Orth and C. Duarte (Editors), Seagrasses: Biology, Ecology and Conservation. Springer, Dordrecht, pp. 295-301.
- Zimmerman, R. 2007. Photosynthesis. Pages 429-435 in M. Denny and S. Gaines, editors. Encyclopedia of Tidepools and Rocky Shores. University of California Press, Berkeley.
- Zimmerman, R.C. 2007. Review of Falkowski, Paul G. and Raven, John A. (2007) *Aquatic Photosynthesis* 2<sup>nd</sup> Edition. *Limnology and Oceanography Bulletin* 16(2):31 -32.

## STUDENTS

### *Master of Science*

- Wittlinger, Sally K.. 2002. Hyperspectral remotes sensing of subtidal macrophytes in optically shallow water. Moss Landing Marine Laboratories, San Jose State University, 53 pp.
- Palacios, Sherry L. 2003. Response of Eelgrass (*Zostera marina* L.) to CO<sub>2</sub> enrichment. Moss Landing Marine Laboratories, San Jose State University, 51 pp.
- Dominick, Clare 2005. Dynamics of carbon allocation in a deep water population of the deciduous kelp, *Pleurophycus gardneri* (Laminariales). Moss Landing Marine Laboratories, San Jose State University, 28 pp.
- Bodensteiner, Laura. 2006. The Impact of Light Availability On Below-Ground Oxygen Release By *Thalassia testudinum* (turtlegrass) and *Zostera marina* (eelgrass). Moss Landing Marine Laboratories, San Jose State University, 50 pp.

### *Doctor of Philosophy*

Pan, Xiaoju. 2007. Observing, Modeling, and Retrieving Bio-optical Properties in Coastal Waters Around the Mouth of the Chesapeake. Department of Ocean, Earth and Atmospheric Sciences, Old Dominion University. 200 pp.

## **TEACHING EXPERIENCE**

1977-1983 UNIVERSITY OF SOUTHERN CALIFORNIA - T. A. responsible for teaching the entire laboratory portion and some of the lecture portion in each of the following courses: General Biology (1 semester), Human Anatomy (4 semesters), General Ecology (1 semester), Systems Ecology (1 semester), Biological Oceanography (2 semesters), Kelp Forest Ecology (1 semester).

1985 CALIFORNIA STATE UNIVERSITY NORTHRIDGE - Guest Lecturer for "Marine Phycology".

1986 CALIFORNIA STATE UNIVERSITY, LONG BEACH - Instructor for "Research Methods for Graduate Students" (1 semester).

1986-1992 HOPKINS MARINE STATION, STANFORD UNIVERSITY - Guest Lecturer and Laboratory Instructor for "Ecophysiology and Cell Biology of Marine Macrophytes" (7 summers).

1988 STANFORD UNIVERSITY - Guest Lecturer for "Biology of the Oceans".

MOSS LANDING MARINE LABORATORIES, SAN JOSE STATE UNIVERSITY - Guest Lecturer for "Biological Oceanography".

1992 STAZIONE ZOOLOGICA, NAPLES ITALY - Visiting faculty for "Seagrasses: from the molecule to the ecosystem". An advanced course on the ecophysiology and molecular biology of seagrasses.

1997 MOSS LANDING MARINE LABORATORIES – Instructor and Course Director MS233 Advanced Topics in Marine Ecology: Laboratory Tools for Physiological and Molecular Ecology. (1 semester)

1999 MOSS LANDING MARINE LABORATORIES – Instructor And Course Director MS 233 Advanced Topics in Marine Ecology.: Introduction to Aquatic Optics. (1 semester).

2004-present OLD DOMINION UNIVERSITY

OEAS 127 General Oceanography (1 semester course)

OEAS 441 Ocean and Earth Science Field Study I (1 semester course, with lab)

OEAS 442 Ocean and Earth Science Field study II (1 semester course, with lab)

OEAS 770/870 Aquatic Photosynthesis (1 semester course, with lab)

OEAS 772/872 Aquatic Optics (1 semester course, with lab)

OEAS 895 Electronics and Instrumentation for Oceanographers (1 semester course, with lab)

## **PROFESSIONAL SERVICE**

1985-86 Member, Diving Control Board, Catalina Marine Science Center, University of Southern California.

1984-present Ad hoc mail reviewer for research proposals submitted to NSF (Biological Oceanography and Polar Programs), NOAA (NERRS and Sea Grant Programs), and the Office of Naval Research.

1984-present Ad hoc mail reviewer for manuscripts submitted to *Limnology & Oceanography*, *Journal of Phycology*, *Journal of Experimental Marine Biology & Ecology*, *Marine Biology*, *Phycologia*, *Marine Ecology Progress Series*, *Oecologia* and *Molecular Marine Biology & Biotechnology*

1990 Organizer, "Patterns and Processes in the Monterey Bay Ecosystem: a Functional Perspective". A special symposium at the 1990 annual meeting of the Western Society of Naturalists, Monterey CA.

1993-1997 Staff referee, Marine Ecology Progress Series

1998-present: Review Editor, Marine Ecology Progress Series

2000-2001 Organizer "Linking Dynamic Temporal Processes With Spatial Domains In Ecosystem Studies". A special session for the 2001 Winter meeting of the American Society of Limnology and Oceanography, Albuquerque, NM

2000-2002 Organizing Committee, Ocean Optics XVI Conference, SPIE

2000 – 2003: Environmental and Laboratory Safety Committee, Moss Landing Marine Laboratories

2003- 2007 ODU representative, Consortium for Oceanographic Research and Education (CORE) Board of Governors

2003 – present ODU representative, Chesapeake Research Consortium

2003 – present ODU representative Virginia Sea Grant Academic Advisory Panel

2005 – present UNOLS aircraft fleet committee SCOAR

2007 – present ODU member representative, Consortium for Ocean Leadership (COL), formerly CORE and JOI

Member, member's nominating committee (2007)

2008 – Chair, member's nominating committee (2008)

## PROFESSIONAL SOCIETIES

American Association for the Advancement of Science	Estuarine Research Federation
American Geophysical Union	Phycological Society of America
American Society of Limnology and Oceanography	Sigma X
American Society of Plant Physiologists	

## EXTRAMURAL SUPPORT SINCE 1997

Grant	Agency:	Duration (Years)	Starting	Total Costs	Status
Nontoxic Antifouling Properties of Zosteric Acid: Potential Industrial Applications	NWRI	1	01-02-97	15,000	Completed
Nontoxic Antifouling Properties of Zosteric Acid: Potential Biomedical Applications	Phairson Inc.	0.5	01-09-97	15,000	Completed
Radiative Transfer in Seagrass Canopies	ONR	3	01-10-96	375,000	Completed
In Water Remote Sensing of Benthic Reflectance from Vegetated Environments	ONR	0.75	01-01-99	84,882	Completed
Genetic Modification of Yeast Cells for Genetic Transformation of Yeast for Biosensor Technology	Arete Assoc., Inc.	3	01-06-98	412,001	Completed
Domoic Acid Biosynthesis in Marine Diatoms. (G. J. Smith, P.I)	SeaGrant	2	01-03-98	120,267	Completed
Radiative Transfer in Submerged Macrophyte Canopies	ONR	2	01-10-99	330,000	Completed
Reflectance from Vegetated Environment	ONR	1	01-11-99	7,350	Completed
Feasibility Study of an Ecoengineering-based Method to increase atmospheric CO <sub>2</sub> fixation into a marine ecosystem	NEDO-Japan	3	01-10-99	200,000	Completed
Adhesive Properties of Coatings Containing Surface-Immobilized Zosteric Acid and Analogs	Phycogen Inc.	1.5	01-06-00	150,000	Completed
Seagrass Restoration by CO <sub>2</sub> Enrichment	NOAA-NERRS	1	10-01-00	16,500	Completed
Seagrass Restoration by CO <sub>2</sub> Enrichment	NOAA-NERRS	1	10-01-01	16,500	Completed
Impact of Submerged Aquatic Vegetation on Radiative Transfer and Hyperspectral Remote Sensing in Optically Shallow Waters	ONR	2	10-01-01	80,000	Completed
Carbonate Dissolution in Shallow Water Tropical Sediments	NSF	3	03-01-02	206,000	Completed
Environmental determinants of tropical seagrass meadow productivity and distribution	NOAA-	1	03-01-02	9,400	Completed
Sea-Truth Support For Hyperspectral Overflights Of St. Joe's Bay, Florida	FERI	1	9-01-06	20,000	Completed
Benthic Ecology from Space	NASA	3	9/1/2005	152,745	Active
CI-CORE	NOAA	4	09-01-04	390,000	Active
Producing an updated synthesis of the Arctic's marine primary production regime and its controls.	NSF	3	10-01-06	233,125	Active
Remote Assessment of Giant Kelp Dynamics – The Engineer of California's Nearshore Ecosystems	NASA	3	4-01-07	180,000	Active
Evaluate the Utility of CALIPSO Data for Ocean Color Application	NASA	2	4-01-07	130,000	Pending