

Clifford R. Merz, Ph.D., PE

University of South Florida (USF)/College of Marine Science (CMS)
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PROFESSIONAL QUALIFICATIONS

Florida Atlantic University	Ocean Engineering	BS, 1984
University of Connecticut, Avery Point	Ocean Engineering	MS, 1986
Florida Atlantic University	Civil/Water Resource Engineering	MS, 1995
University of South Florida	Engineering Science/Engineering	PhD, 2008

APPOINTMENTS

- **1998 – Present. Senior Research Faculty Ocean Engineer**, College of Marine Science (CMS), University of South Florida (USF), St. Petersburg, FL. Coastal Ocean Monitoring and Prediction System (COMPS) Program and High Frequency Radar (HFR) Operations Director.
- **2012 – Present. Elected City Commissioner (Vice-Mayor)**, City of Safety Harbor, FL. Elected 2012, 2015 and 2018. Policy and budget decisions for 18,000+ residents and ~ \$70 million budget.
- **2003 – Present. Founder and President of Diallytics, Inc.**, Safety Harbor, FL. A small business technology company focused on water/food/energy nexus solutions. Website: www.diallytics.com.
- **1988 – 1998. Assistant Technical Director**, ManTech Advanced Systems International, Incorporated/Applied Measurement Systems International (AMSI); Hollywood, FL. Underwater acoustic analysis and at-sea testing of Naval towed array active and passive sonar systems.
- **1986 - 1988. Senior Analytical Engineer, Pratt Whitney (PW), Mature Engines Group**; West Palm Beach, FL. Structural analysis of rotational and static aircraft engine hardware.

RESEARCH ACTIVITIES

- **Author and investigator (Principal [PI] and Co-PI) of competitive research grants and fundraising events conducted during academia and the private sector totaling \$4.11M (>\$2.22M as PI):**
 - ✓ [1] PI - National Academy of Science, Engineering, and Medicine (NAEM) - \$1,371,027
 - ✓ [1] Co-PI – ONR Defense University Research Instrumentation (DURIP) Program - \$150,000
 - ✓ [4] PI - Florida's Emergency Management & Preparedness Trust Fund [EMPATF] Grants - \$664,826
 - ✓ [11] Co-PI - NOAA/SECOORA IOOS Grants for COMPS HF Radar Stations - \$1,231,076
 - ✓ [9] PI and Co-PI NOAA/SECOORA IOOS Grant for COMPS Coastal Tidal Weather Stations - \$430,701
 - ✓ [4] PI - COMPS O&M contributions from various agencies/stakeholder groups - \$13,000 total
 - ✓ [2] PI - Small Business Innovation Research (SBIR) Phase I - \$149,026 (DARPA [1994], NAVSEA [1989])

SYNERGESTIC ACTIVITIES

- **Senior Member (2020):** National Academy of Inventors recognition of contributions pertaining to marine-based renewable energy technologies and related inventions.
- **Presenter (2019):** 25th North American Diatom Symposium (NADS) held at the University of Georgia's Rock Eagle 4-H center in Eatonton, Georgia from July 31 – August 4, 2019. Presentation entitled: **Bubble Farming: Scalable Microcosms for Diatom Biofuel Production.**
- **Invited Speaker (2017):** Pinellas County Economic Leadership Symposium. Workforce panel: Preparing for the future.
- **Large-Scale Algal Cultivation, Harvesting and Downstream Processing 5 day Workshop (2017).** ATP³ Arizona Center for Algae Technology and Innovation (AzCATI).

- **Aquaponics Technology and Design 5 day Workshop** (2016), and **Recirculating Aquaculture Systems (RAS) Technology 3 day Workshop**. Pentair Aquatic Eco-Systems, Apopka, FL.
- **Chairman** (2016-Present): **Marine Renewable Energy Committee, Marine Technology Society**; Vice-chair 2012-2016.
- **President** (2015): **National Academy of Inventors (NAI) USF Chapter** (2011-Present). Coordination with university and community personnel responsible for technology transfer, workforce development, entrepreneurship, business incubation and community outreach.
- **Certificate in Algae Production** (2015), National Algae Association training program.
- **Business Mentor** (Fall 2014): **National Science Foundation (NSF) I-CORPS Austin Cohort 1**. Team Title: Software Suite for Quality Control of Patterned Nanostructures.
- **MTS OCEANS 14'** (2014) Conference Sustainable Aquaculture Technologies STJ.6.2 Session Chair, Newfoundland, Canada.
- **Florida League of Cities (2014) Home Rule Hero Award recipient** – Awarded to “legislators who have showed strong and consistent support of municipal home rule issues”.
- **2-Term Board of Director Member and Treasurer** (2007-2013): Southeast Coastal Ocean Observing Regional Association (**SECOORA**), part of the federal **NOAA U.S. IOOS**.
- **Certificate in Renewable Energy Technology** (2010), **NSF's Consortium for Education in Renewable Energy Technology (CERET) Program**.
- **Wind Turbine Design, Construction and Maintenance Workshops with Mick Sagrillo** (2008), Midwest Renewable Energy Association (MREA), Stevens Point, WI.
- **Biodiesel & Veggie Oil Fuels Workshop** (2006), MREA, Madison, WI.
- **Utility Grid-tied 10KW Wind Turbine Hands-on Installation Workshop** (2005), MREA, Merrill, WI.
- **3.6KW Photovoltaic Grid-tied System Hands-on Installation Workshop** (2004), MREA, Evanston, IL.
- **Desalination Technology and Engineering Graduate Certificate** (2003), USF, Tampa, FL – Dr. Robert P. Carnahan, Program Coordinator. Selected courses include: Membrane Theory and Practice; Pilot Plant Design and Operation; Design of Membrane Desalination Systems.

RELATED PRODUCTS (Publications and Patents) - Google Scholar Citation 7-yr Average = 40.

- Liu, Y., Merz, C. R., Weisberg, R. H., Shay, L. K., Glenn, S. and Smith, M. 2020: Evaluation of altimetry and model products in the Straits of Florida with high-frequency radar radial currents. Monograph on HF radars, IET, Editors. Eric Gill and W. Huang, 29 pp. (**submitted**).
- Merz, C.R., 2020 – Patent Application. Chitosan Based Membrane and Associated Method of Use (**submitted**).
- Merz, C.R., 2019: Physicochemical and Colligative Investigation of Alpha (Shrimp Shell) and Beta (Squid Pen) Chitosan Membranes: Concentration Gradient Driven Water Flux and Ion Transport for Salinity Gradient Power and Separation Process Operations. *ACS Omega*, **4**, pp. 21027-21040, doi: 10.1021/acsomega.9b02357.
- Gordon, R., Merz, C.R., Gurke, S. and Schoefs, B., 2019. Bubble farming: Scalable microcosms for diatom biofuel and the next Green Revolution. Chapter 22 of *Diatoms: Fundamentals & Applications* [DIFA, Volume 1 in the series: Diatoms: Biology & Applications, series editors: Richard Gordon & Joseph Seckbach]. J. Seckbach and R. Gordon, (eds.) Wiley-Scrivener, Beverly, MA, USA: 583-654, doi:10.1002/9781119370741.ch22.
- Merz, C.R., Main, K.L., 2017. Microalgae Bioproduction – Feeds, Foods, Nutraceuticals, and Polymers. Chapter 5 of *Fuels, Chemicals and Materials from the Oceans and Aquatic Sources*, pp. 84-112. Eds. Kerton, F.M., Yan, N., John Wiley & Sons Ltd., doi: 10.1002/9781119117193.ch5.
- Liu, Y., Merz, C.R., Weisberg, R.H., O'Loughlin, B.K. and Subramanian, V., 2017, Data return aspects of CODAR and WERA HFRs in mapping currents, in *Observing the Oceans in Real Time*, edited by Venkatesan et al., Springer, 227-241, http://dx.doi.org/10.1007/978-3-319-66493-4_11.

- Merz, C.R., Liu, Y., Gurgel, K.-W., Petersen, L., Weisberg, R.H., 2015. Effect of Radio Frequency Interference Noise Energy on WERA HF Radar Performance Using the 'Listen Before Talk' Adaptive Noise Procedure on the West Florida Shelf. *Coastal Ocean Observing Systems: Advances and Syntheses*. Elsevier, doi:10.1016/B978-0-12-802022-7.00013-4.
- Dzvonkovskaya, A., Merz, C.R., Liu, Y., Weisberg, R.H., Helzel, T., Petersen, L., 2014: Initial surface current measurements on the West Florida shelf using WERA HF ocean radar with multiple input multiple output (MIMO) synthetic aperture. *Oceans'14 MTS/IEEE Conference proceedings - Xplore*, St. Johns, Newfoundland, Canada, doi:10.1109/OCEANS.2014.7003235.
- Dzvonkovskaya, A., Merz, C.R., Helzel, T., Liu, Y., Weisberg, R.H., 2014: Initial results of ship detection and tracking using WERA HF ocean radar with MIMO configuration. *Radar Symposium (IRS), 15th International - Xplore*, Gdansk, Poland, doi:10.1109/IRS.2014.6869265.
- Gomez, R., Merz, C.R., Helzel, T., Liu, Y., Petersen, L., Weisberg, R.H., Kniephoff, M., 2014: Real-time quality control of current velocity data on individual grid cells in WERA HF radar. *Oceans'14 MTS/IEEE Conference proceedings - Xplore*, Taipei, Taiwan, doi:10.1109/OCEANS-TAIPEI.2014.6964502.
- Liu, Y., Weisberg, R. H., and Merz, C.R., 2014: Assessment of CODAR Seasonde and WERA HF Radars in Mapping Surface Currents on the West Florida Shelf. *J. Atmos. Oceanic Technol.*, **31**, 1363–1382, doi:10.1175/JTECH-D-13-00107.1.
- Merz, C.R., 2013. Consideration of a Variable Frequency Energy Conversion System for Marine and Onshore Wind Energy Extraction. *Marine Technology Society Journal*, Volume 47, Number 4, pp. 218-225, doi: <http://dx.doi.org/10.4031/MTSJ.47.4.11>.
- Merz, C.R., Weisberg, R.H., Liu, Y., 2012. Evolution of the USF/CMS CODAR and WERA HF Radar Network. *Oceans'12 MTS/IEEE Conference proceedings - Xplore*, Hampton Roads, VA, doi:10.1109/OCEANS.2012.6404947.
- Merz, C.R., Moreno, W., Barger, M., Lipka, S. M., 2010. Salinity Gradient Power (SGP): A Developmental Roadmap Covering Existing Generation Technologies and Recent Investigative Results into The Feasibility of Bipolar Membrane-Based Salinity Gradient Power Generation. *Cognizant Communication Corporation - Technology and Innovation*, 14(3/4), pp. 249-275, doi: 10.3727/194982412X13500042168857.
- Merz, C.R., 2010: **US Patent 7,736,791 B1**, Dialytic Power Generation Using Diffusion Gradients.
- Liu, Y., Weisberg, R.H., Merz, C.R., Lichtenwalner, S., Kirkpatrick, G.J., 2010: HF Radar Performance in a Low-Energy Environment: CODAR Seasonde Experience on the West Florida Shelf. *J. Atmos. Oceanic Technol.*, **27**, 1689–1710, doi:10.1175/2010JTECHO720.1.
- Merz, C.R., 2008. Investigation and Evaluation of a Membrane Based Seawater Concentration Cell and Its Suitability as a Low Power Energy Source for Energy Harvesting/MEMS Devices, University of South Florida PhD Manuscript, Copyright December 2008.
- Hudon, A.L., Moulton, E.L., Luther, M.E., Gilbert, S., Scudder, J., Merz, C.R., 2008. The Watershed Watchers Program: A Collaborative Effort to Integrate Ocean Observing Data into a K-5 Marine Science Curriculum. *Ocean Sciences*.
- Merz, C.R., Weisberg, R.H., Smith, P., Law, J., Cole, R.D., Donovan, J., Tilbury, G., Lembke, C., Myhre, D., 2007. Development of a Self-Contained, Satellite Based, Moored Surface Buoy Position Tracking Device. *MTS/IEEE Oceans 2007 Conference Proceedings*, doi: 10.1109/OCEANS.2007.4449363.
- Luther, M., Merz, C.R., Scudder, J., Baig, S.R., Pralgo, J., Thompson, D., Gill, S., Hovis, G., 2007. Water Level Observations for Storm Surge. *Journal of the Marine Technology Society*, **41(1)**, 35-43, doi: 10.4031/002533207787442277.
- Kelly, F.J., Bonner, J.S., Perez, J. C., Adams, J.S., Prouty, D., Trujillo, D., Weisberg, R.H., Luther, M.E., R He, R., Cole, R., Donovan, J., Merz, C.R., 2002: An HF-radar test deployment amidst an ADCP array on

the West Florida Shelf. *Oceans'02 MTS/IEEE Conference proceedings - IEEE Xplore*, 2, 692 - 698, doi:10.1109/OCEANS.2002.1192053.

- Merz, C.R. (2001). An Overview of the Coastal Ocean Monitoring and Prediction System (COMPS). *Oceans'01 MTS/IEEE Conference proceedings - IEEE Xplore*, Honolulu, HI, 2, 1183-1187, doi:10.1109/OCEANS.2001.968281.
- Merz, C.R., August 27, 1998. TOTA 96, 97, and June 98 Low Frequency Tonal Analysis Summary Report, AMSI, Hollywood, FL, TM-989.
- Merz, C.R., August 12, 1998. BAR 51 Channel Low Frequency Array Factory Acceptance Test and NUWC/LEFAC Calibration Summary Test Report, AMSI, Hollywood, FL, TM-985.
- Deus, A. L, Ames, G., Dandridge, A., Kirkendall, C., Tveten, A., Hauptman, R. O., Merz, C.R., Brooks, L., April 1998. Thin Optical Towed Array (TOTA96) LPO Test Report (U), NUWC-NPT TR 10908, New London, CT, (Confidential).
- Merz, C.R., March 1998. TB-16/BQ Le Dip: Off-Line Processing of TB-16/BQ Array Data Recorded Onboard the USS BUFFALO in September 1996, AMSI, Hollywood, FL, TMS-984, (Secret).
- Merz, C.R., March 1998. BAR 51 Channel Low Frequency Array (LFA) NUWC/LEFAC Calibration Test Plan, AMSI, Hollywood, FL, TP-982.
- Monjo, C. L., Schapley, R. F., Merz, C.R., January 1998. TB-16 UHF ADM Interim Technical Report, AMSI, Hollywood, FL, TM-980.
- Zimmerman, W. C., and Merz, C.R., December 1997. TB-16 UHF ADM System/Segment Specification - Topic N95-054 Item Specification, AMSI, Hollywood, FL, TM-978.
- Merz, C.R., November 1997. R/V CHINOOK Masker Acoustic Performance, Letter 613:41: CRM to Mr. Steve Finley dated 20 November 1997, (Confidential).
- Merz, C.R., and Douglass, B. L., October 1997. Transfer Function Measurement Results for TB-16/23 Array Module Test Set [AMTS] (U), AMSI, Hollywood, FL, TMC-977 (Confidential).
- Merz, C.R., and Douglass, B. L., October 1997. Lightweight Tow Cable and TB-23/BQ Array Evaluation Aboard USS Topeka (SSN 754) (U), AMSI, Hollywood, FL, TMS-976, (Secret).
- Rubin, F. A., Merz, C.R., and Douglass, B. L., August 1997. Quick Look Report of TB-23/BQ Towed Line Array Acoustic Evaluations at Lake Pend Oreille (LPO), ID (U), NUWC, Newport, RI, TM No. 972133, (Confidential).
- Galvin, L. and Merz, C.R., August 1997. TB-16E/F Telemetry Compatibility Test Results (U), NSWCCD-SIG-97/C97/236-7320, NSWC, West Bethesda, MD, (Confidential).
- Merz, C.R., August 1997. DBAR LFA Preliminary Design Review Trip Report, AMSI, TR-974.
- Merz, C.R., May 1997. Requirement for Proposal Beamforming Acoustic Recording System (BARS) Low Frequency Array (LFA), AMSI, Hollywood, FL, AMSI-970.
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- Hepp, J. S. and Merz, C.R., March 1997. Nautronix 23 Channel Measurement Array Factory Acceptance Test Plan, AMSI, Hollywood, FL, TP-963.
- Merz, C.R., March 1997. TB-23/BQ Long HF November 96 LPO Test Result Summary - Follow-on Investigation, Letter 597:15:CRM to Mr. Frank Rubin dated 18 March 1997, (Confidential).
- Merz, C.R., January 1997. High Frequency Array 2 Channel Test Module NUWC/LEFAC Calibration Quick Look Test Report, AMSI, Hollywood, FL, TM-959.
- Merz, C.R., January 1997. High Frequency Array 2 Channel Test Module Calibration Test Plan, AMSI, Hollywood, FL, TP-955.
- Merz, C.R., January 1997. TB-23/BQ Long HF November 96 LPO Test Result Summary, Letter 597:01: CRM to Mr. Frank Rubin dated 13 January 1997, (Confidential).
- Safford, R. E, Hauptman, R. O., Merz, C.R., Greenberg, S., August 1996. TB-16F/BQ (SN 003) LPO Tow Test Report, October 1995 (U), NUWC, New London, CT, TM No 951129 (Confidential).

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- Guarrasi, J. R., Merz, C.R., and Douglass, B. L., May 1996. Summary Report of the TB-29/BQ S/N 01 Electronic and Coherent Noise Test (U), NUWC, New London, CT, TM No. 961045 (Confidential).
- Douglass, B. L. and Merz, C.R., February 1996. Submarine Low Cost Littoral Water Sonar Passive Localization System, Phase I Final Technical Report (U). AMSI, Hollywood, FL, TRC-865 (Confidential).
- Merz, C.R., December 1995. Sediment Exchange in Tidal Inlets. Civil Engineering Department Master's Thesis, Florida Atlantic University, Boca Raton, FL. <http://purl.flvc.org/fcla/dt/15206>.
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- Merz, C.R. and Cichock, J. A., April 1995. TB-29/BQ MET Acoustic Module Calibration Trip Report, AMSI, Hollywood, FL, TR-837 (Confidential).
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- Merz, C.R. and Zimmerman, W. C., September, 1994. Dolphin Sonar Transducer and Array Final Technical Report, AMSI, Hollywood, FL, TM-808.
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- Merz, C.R., February 1994. TB-23/BQ Pendant Cable Adapter Titanium/Polyurethane Peel Test Plan, AMSI, Hollywood, FL, TM-753.
- Merz, C.R., *et al.*, February 1994. ATAMS Acoustic Calibration Test Plan, AMSI, TM-694.
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- Bockstege, J. A., Merz, C.R. and Kordes, P.H.H., January 1993. ATAMS Factory Acceptance Testing Procedural Document, AMSI, Hollywood, FL, TM-655.
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- Merz, C.R., October 1992. ATAMS Array Directionality Performance Vs Allowable Hydrophone Spacing Tolerances, AMSI, Hollywood, FL, TM-629.
- Merz, C.R., September 1992. Improved High Directive Array (IHDA) Electronics Pressure Vessel Heat Transfer Model Substantiation, AMSI, Hollywood, FL, TM-628.
- Merz, C.R., September 1992. AMFIP Towed Array Measurement System Array Directionality Performance Verses Buoyancy Induced Depth Variations, AMSI, Hollywood, FL, TM-614.
- Merz, C.R., March 1992. AMFIP Towed Array Measurement System (ATAMS) Light/Heavy Towcable Specification, AMSI, Hollywood, FL, TM-572.
- Merz, C.R., February 1992. AMFIP Towed Array Measurement System Towcable Trip Report- Meetings Held at Brantner and Associates, The Consolidated Products Corporation, Tension Member Technology, and Sonatech, Inc., AMSI, Hollywood, FL, TR-579.
- Merz, C.R., February 1992. AMFIP Towed Array Measurement System (ATAMS) Lake Pend Oreille Test Module Towing Profile, AMSI, Hollywood, FL, TM-578.
- Merz, C.R., November 1991. LSV Analytical Study of a Precipitate Found on an Insulated Accelerometer Mounting Stud, AMSI, Hollywood, FL, TM-555.
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- Merz, C.R., July 1991. AMFIP Towed Array Measurement System (ATAMS) Beacon/WQC Conceptual Design, AMSI, Hollywood, FL, TM-533.
- Merz, C.R., June 1991. Electro/Optical Tow Cable Report, AMSI, Hollywood, FL, TM-527.
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- Merz, C.R., April 1991. ATAMS Electro/Optical Tow Cable Functional Design Report, AMSI, TM-511.
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- Merz, C.R., February 1991. ATAMS Electro/Optical Tow Cable Trip Report - Meetings Held at Rochester Cable Company /the Naval Coastal Systems Center", AMSI, Hollywood, FL, TM-491.
- Cichock, J. A., Merz, C.R. and Douglass, B. L., December 1990. Stern Aspect Radiated-Noise Evaluation of DTRC/ARD 36-Foot LCP (U), AMSI, Hollywood, FL, TMC-494 (Confidential).
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- Douglass, B. L., Merz, C.R. and Cichock, J. A., April 1990. TB-23A/BQ Preamplifier Filter Evaluation (U), AMSI, Hollywood, FL, TMC-420 (Confidential).
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- Zimmerman, W. C., Merz, C.R., March 1990. Variable Pressure Water Tunnel Evaluation Test Plan, AMSI, Hollywood, FL, TM-417.
- Merz, C.R. and Hayman, D.P., November 1989. TB-23/BQ SN 036 Electronic Noise Floor and Acoustical Calibration Testing, NRL/USRD, LEFAC (U), AMSI, Hollywood, FL, TM-389 (Confidential).
- Bullwinkel, P.E. and Merz, C.R., October 1989. BHAR Towed Array Hose Transfer Function: A Re-Evaluation (U), AMSI, Hollywood, FL, TM-381 (Confidential).
- Merz, C.R. and Cichock, J.A., October 1989. SN5 Modified AMTS Qualification Test (U), AMSI, Hollywood, FL, TMC-361 (Confidential).
- Merz, C.R. and Douglass, B.L., September 1989. TB-23A/BQ Experimental IR&D Thinline Module (Gould-OSD-SN XN9) and Vibration Isolation Module (VIM) Evaluation (U), NUWC, New London, CT, TM 89-1196 (Confidential).
- Merz, C.R. and Douglass, B.L., June 1989. Quick Look Report TB-23/BQ Vibration Isolation Module and STAR 200 Hose Cold Water Evaluation (U), NUWC, New London, CT, TM 89-1109 (Confidential).
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- Merz, C.R., April 1989. Fluid Induced Drag Comparison Study Modified HGA Molded Stave/Alternate Boot Stave, AMSI, Hollywood, FL, TM-331.
- Cichock, J. A., Merz, C.R. and Douglass, B. L., January 1989. TB-23/BQ Block Upgrade VIM Tests Onboard R/V ATHENA Sea Trial 88-15 (U), AMSI, Hollywood, FL, TMC-318 (Confidential).
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- Merz, C.R. and Davis, A. F., June 1987. J52-P6 Redesign 12th Stage HPC Disk Low Cycle Fatigue Analysis of Snap Fillets, Pratt and Whitney, West Palm Beach, FL, FTDM 2500 Rev A.