

Randy Russell

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University of South Florida

College of Marine Science

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Research Interest and Specializations:

Primarily involved in the design of digital electronics for all sensors and systems developed at the USF Center for Ocean Technology. Utilize versatile microcontrollers for data acquisition and control functions. Develop unique instrumentation and systems that can be configured to log data internally for long durations, or monitored in real-time. Interface to satellite transceivers for data reporting and control purposes. Integrate Echelon Lonworks intelligent distributed control concepts into some sensors and data collection systems.

Provide interfacing to spectrophotometers, digital devices and instruments, and analog signals for measurements of interest. Control and monitor various hardware items such as pumps, valves, LED's, detectors, and commercial measurement instruments. Experience in ensuring that instruments are designed for use in rugged environmental conditions. Design, layout, and test printed circuit boards for instruments.

Develop embedded software for sensors and instrumentation systems. Vast experience with various digital communication protocols. Design user-interfaces to setup instruments and offload data from them. Involved in maximizing battery life in standalone instruments which remain underwater and/or in remote locations for long periods of time collecting and logging data. Strive to reduce the size of instruments as much as practical. Work with mechanical designers to develop custom packaging of electronics in watertight housings.

Notable projects:

- High resolution sampler. Towed subsea platform collecting sensor data and reporting real time to the surface. Provided majority of the hardware design and some software design.
- Bottom Stationed Ocean Profiler (BSOP). Designed all of the electronics for this vertical underwater sampling system. Developed software for interfacing and control purposes.
- COMPS Buoy Array. Provided system level and board level design of the data acquisition network. Designed software to collect the data, store it, and report back via satellite communications.
- M-SEAS Instrument. Provided electronics hardware design for underwater instrument used to determine iron concentrations in seawater. Interfaced the hardware to computer user program for control purposes.
- Portable PH Photometer. Developed hardware for low-powered instrument used to measure the pH of seawater. Interfaced to an I-Phone app via Bluetooth. Iterative design process with customer to develop the most user-friendly instrument.
- Gliders. Involved in deploying, piloting, and collecting data from underwater gliders for oceanographic research purposes.

Education

MSEE - University of South Florida, Tampa, FL

BSEE - The Ohio State University, Columbus, OH

Professional Experience

07/83 – 07/85

Instrumentation Engineer, Goodyear Atomic Corporation, Piketon, OH

09/85 – 02/95

Senior Systems Engineer, General Electric/ Martin Marietta Neutron Devices, Largo, FL

02/95-Present

Electronics Engineer, Center for Ocean Technology, St. Petersburg, FL

Publications

Xie, S., J. Law, R. Russell, T. Dixon, C. Lembke, R. Malservisi, M. Rodgers, G. Iannaccone, S. Guardatao, D. Naar, D. Calore, N. Fraticelli, J. Brizzolara, J. Gray, M. Hommeyer, J. Chen (2019) "Seafloor Geodesy in Shallow Water with GPS on an Anchored Spar Buoy", *Journal of Geophysical Research: Solid Earth*, 124 DOI: 10.1029/2019JB018242

Langebrake, L. C., C. E. Lembke, R. H. Weisberg, R. H. Byrne, D. R. Russell, G. Tilbury, and R. Carr (2002) "Design and Initial Results of a Bottom Stationing Ocean Profiler," *Oceans 2002 MTS/IEE*, DOI: 10.1109/OCEANS.2002.1193254.