Dr. Jonathan D. Sharp

Postdoctoral Scholar
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Research Interests

I am a chemical oceanographer with an interest in how carbon, oxygen, and dissolved nutrients cycle through the global ocean. Some of my current work involves using observational data from ship-based surveys and autonomous platforms to study spatiotemporal variability in ocean biogeochemistry. I have extensive experience with the marine carbonate system, and have contributed to the development of analytical and computational tools for acquiring and working with carbonate system data. Future research will focus on exploring novel uses of measurements from autonomous platforms to further our understanding of ocean carbon storage and biogeochemistry.

Academic Appointments

2020– **Postdoctoral Scholar**
University of Washington CICOES and NOAA Pacific Marine Environmental Laboratory, Seattle, WA
Research Topic: Marine Biogeochemical Cycling

Education

2020 **Ph.D. in Marine Science**
University of South Florida, St. Petersburg, FL
Dissertation: Analytical Methods and Critical Analyses Supporting Thermodynamically Consistent Characterizations of the Marine CO_2 System
Research Advisor: Robert H. Byrne

2014 **B.S. in Marine and Atmospheric Science**
University of Miami, Coral Gables, FL
Research Topic: Ionic Interactions in Seawater
Research Advisor: Frank J. Millero

Peer-Reviewed Publications

[1] **Sharp, J.D.**, Fassbender, A.J., Carter, B.R., Lavin, P.D., Sutton., A.J., 2022. A monthly surface pCO_2 product for the California Current Large Marine Ecosystem. Earth System Science Data 14, 2081–2108. 10.5194/essd-14-2081-2022

[2] Humphreys, M.P., Lewis, E.R., **Sharp, J.D.**, Pierrot, D., 2022. PyCO2SYS v1.8: marine carbonate system calculations in Python. Geoscientific Model Development 15, 15–43. 10.5194/gmd-15-15-2022

[3] Jiang, L.Q., Pierrot, D., Wanninkhof, R., Feely, R.A., Tilbrook, B., Alin, S., Barbero, L., Byrne, R.H., Carter, B.R., Dickson, A., Gattuso, J.-P., Greeley, D., Hoppema, M., Humphreys, M.P., Karstensen, J., Lange, N., Lauvset, S.K., Lewis, E.R., Olsen, A., Pérez, F.F., Sabine, C., **Sharp, J.D.**, Tanhua, T., Trull, T., Velo, A., Allegra, A.J., Barker, P., Burger, E., Cai, W.J., Chen, C.T., Cross, J., Garcia, H., Hernandez-Ayon, J.M., Hu, X., Kozyr, A., Langdon, C., Lee, K., Salisbury, J., Wang, Z.A., Xue, L., Yates, K. Best-practice Data Standards for Discrete Chemical Oceanographic Observations. Frontiers in Marine Science 8, 705638. 10.3389/fmars.2021.705638

[4] Carter, B.R., Bittig, H.C., Fassbender, A.J., **Sharp, J.D.**, Takeshita, Y., Xu, Y.-Y., Álvarez, M., Wanninkhof, R., Feely, R.A., Barbero, L., 2021. New and Updated Global Empirical Seawater Property Estimation Routines. Limnology and Oceanography: Methods 19, 785–809. 10.1002/lom3.10461

[5] **Sharp, J.D.**, Byrne, R.H., 2021. Technical note: Excess alkalinity in carbonate system reference materials. Marine Chemistry 233, 103965. 10.1016/j.marchem.2021.103965

[6] Jiang, L.-Q., Feely, R.A., Wanninkhof, R., Greeley, D., Barbero., L., Alin, S., Carter, B.R., Pierrot, D., Featherstone, C., Hooper, J., Melrose, C., Monacci, N., **Sharp, J.**, Shellito, S., Xu, Y.-Y., Kozyr, A., Byrne, R.H., Cai, W.-J., Cross, J., Johnson, G.C., Hales, B., Langdon, C., Mathis, J., Salisbury, J., Townsend, D.W., 2021. Coastal Ocean Data Analysis Product in North America (CODAP-NA) – An internally consistent data product for discrete inorganic carbon, oxygen, and nutrients on the U.S. North American ocean margins. Earth System Science Data 13, 2777–2799. 10.5194/essd-13-2777-2021

[7] **Sharp, J.D.**, Byrne, R.H., 2020. Interpreting measurements of total alkalinity in marine and estuarine waters in the presence of proton-binding organic matter. Deep Sea Research Part I: Oceanographic Research Papers 165, 103338. 10.1016/j.dsr.2020.103338

[8] **Sharp, J.D.**, Byrne, R.H., 2019. Carbonate ion concentrations in seawater: Spectrophotometric determination at ambient temperatures and evaluation of propagated calculation uncertainties. Marine Chemistry 209, 70–80. 10.1016/j.marchem.2018.12.001

[9] **Sharp, J.D.**, Byrne, R.H., Liu, X., Feely, R.A., Cuyler, E.E., Wanninkhof, R., Alin, S.R., 2017. Spectrophotometric Determination of Carbonate Ion Concentrations: Elimination of Instrument-Dependent Offsets and Calculation of In Situ Saturation States. Environmental Science and Technology 51, 9127–9136. 10.1021/acs.est.7b02266

[10] **Sharp, J.D.**, Albehadili, M.H.M., Millero, F.J., and Woosley, R.J., 2015. Estimating the Density and Compressibility of Natural Hypersaline Brines Using the Pitzer Ionic Interaction Model. Aquatic Geochemistry 21, 11–29. 10.1007/s10498-015-9252-4

[11] Millero, F.J., **Sharp, J.D.**, 2013. Estimation of the Partial Molal Adiabatic Compressibility of Ions in Mixed Electrolyte Solutions Using the Pitzer Equations. Journal of Chemical and Engineering Data 58, 3458–3463. 10.1021/je400734v

Computational Tools, Data Products, and Technical Reports

[1] **Sharp, J.D.**, Fassbender, A.J., Carter, B.R., Lavin, P.D., Sutton, A.J., 2021. RFR-CCS: A monthly surface pCO_2 product for the California Current Large Marine Ecosystem (v1.1) [Data set]. 10.5281/zenodo.5523389

[2] Frenzel, H., **Sharp, J.D.**, Fassbender, A.J., Plant, J.N., Maurer, T.L., Takeshita, Y., Nicholson, D.P., Gray, A.R., 2021. BGC-Argo-Mat: A MATLAB toolbox for accessing and visualizing Biogeochemical Argo data (v1.2). 10.5281/zenodo.4971318

[3] **Sharp, J.D.**, Pierrot, D., Humphreys, M.P., Epitalon, J.-M., Orr, J.C., Lewis, E.R., & Wallace, D.W.R., 2021. CO2SYSv3 for MATLAB (v3.2.0). 10.5281/zenodo.3950562

[4] Millero, F.J., **Sharp, J.D.**, Woosley, R.J., Rodriguez, C., Paine, J., Levy, J., Williamson, J., Byrne, J., and Mastropole, K. (2014) Global Ocean Repeat Hydrography Study: pH and Total Alkalinity Measurements in the Atlantic Ocean, A16 North and South. University of Miami Rosenstiel School of Marine and Atmospheric Science.

Cruise Experience (108 days)

2021 **DIC Analyst & Data Manager, NOAA/PMEL West Coast Ocean Acidification Cruise**
Chief Scientists: Richard Feely and Brendan Carter, R/V Ronald H. Brown (35 days)

2020 **Carbonate Chemistry Analyst, USF Carbonate System Sampling in the Gulf of Mexico**
Chief Scientist: Kristen Buck, R/V Weatherbird II (4 days)

2017 **pH/carbonate Analyst, NOAA/AOML Gulf of Mexico Ecosystems and Carbon Cycle Cruise**
Chief Scientists: Leticia Barbero and Denis Pierrot, R/V Ronald H. Brown (35 days)

2016 **pH/carbonate Analyst, NOAA/PMEL West Coast Ocean Acidification Cruise**
Chief Scientists: Simone Alin and Richard Feely, R/V Ronald H. Brown (34 days)

Research Funding

2022	Lead PI: T. Boyer (NOAA NCEI); Co-PI's: L.Q. Jiang (CISESS/NOAA), B. Carter (CICOES/NOAA), **J. Sharp (CICOES/NOAA)**, P. Lavin (CISESS/NOAA). Temporal changes of ocean acidification indicators in the U.S. Large Marine Ecosystems (LMEs) - an operational data product at NOAA/NCEI in support of NOAA's National Marine Ecosystem Status effort. NOAA Ocean Acidification Program. 7/22–6/24.	$199,831
2019	**J. Sharp (USF CMS)** and R. Venturelli (USF CMS). Isotopic and Carbonate Chemistry Characteristics of an Antarctic Subglacial Lake. USF Von Rosenstiel Graduate Student Innovation Award.	$5,000
2019	Lead PI: R.H. Byrne (USF CMS). Characterization of aragonite and calcite solubility products in seawater using modern CO_2 system measurement techniques. NSF Division of Ocean Sciences. 2/20–1/23. **J. Sharp (USF CMS)** led the writing and preparation of proposal.	$405,933

Teaching and Mentorship Experience

2022 **Mentor, NOAA Hollings Program**
Mentored an undergraduate student intern from the University of Maryland who performed a summer project at NOAA PMEL using Biogeochemical Argo data.

2022 **Guest Lecturer, Intro to Environmental Metrology, Georgetown University**
- The seawater CO_2 system and uncertainty considerations (4/19/2022)

2022 **Guest Lecturer, Marine Chemistry, University of Washington**
- The Inorganic Carbon System: Acid–Base Chemistry (2/2/2022)

2018 **Guest Lecturer, Physical Chemistry of Seawater, University of South Florida**
- Using CO2SYS to Make CO_2 System Calculations I (10/16/2018)
- Using CO2SYS to Make CO_2 System Calculations II (10/18/2018)
- Uncertainty Propagation in Marine CO_2 System Calculations (11/13/2018)

2018 **Teaching Assistant, Physical Chem. of Seawater, University of South Florida**
- Organized classes and exam review sessions / graded homework assignments

2017 **Mentor, Eckerd College / USF College of Marine Science**
Mentored an undergraduate student intern from who performed measurements of pH and carbonate ion concentration during the NOAA/AOML Gulf of Mexico Ecosystems and Carbon Cycle cruise.

Academic Fellowships

2018	**Knight Endowed Fellowship for Marine Science** USF College of Marine Science	$26,000/yr (1.5 years)
2016	**NSF Graduate Student Research Fellowship** National Science Foundation	$34,000/yr (3 years)
2015	**Anne and Werner Von Rosenstiel Fellowship** USF College of Marine Science	$10,000/yr (1 year)

Recent Presentations

[1] **Sharp, J.D.**, Fassbender, A.J., Carter, B.R., Johnson, G.C. Enhanced reconstructions of ocean interior dissolved oxygen using biogeochemical Argo float data. UW Chemical Oceanography Lunch Seminar. 3/4/2022 (talk).

[2] **Sharp, J.D.**, Fassbender, A.J., Carter, B.R., Johnson, G.C., Enhanced reconstructions of ocean interior dissolved oxygen using biogeochemical Argo float data. 2022 Ocean Sciences Meeting. 2/28/2022 (virtual talk).

[3] **Sharp, J.D.**, Fassbender, A.J., Carter, B.R. Observation-based surface pCO_2 and air–sea CO_2 flux in the California Current Ecosystem. OCB 2021 Summer Workshop. Virtual. 6/21/2021 (virtual poster).

[4] **Sharp, J.D.** Analytical Methods and Critical Analyses Supporting Thermodynamically Consistent Characterizations of the Marine CO_2 System. Dissertation Defense. USF College of Marine Science. St. Petersburg, FL. 10/6/2020 (talk).

[5] **Sharp, J.D.**, Byrne, R.H. Alkalinity and Intercomparability: proton exchange with organic bases during TA titrations induces carbonate system inconsistencies. 2020 Ocean Carbonate System Intercomparison Forum. 6/29/2020 (virtual talk).

[6] **Sharp, J.D.**, Byrne, R.H. Total Alkalinity Determined by Titration in the Presence of Dissolved Organic Matter. 2020 Ocean Sciences Meeting. San Diego, CA. 2/20/2020 (poster).

[7] **Sharp, J.D.** and Venturelli, R. Understanding Isotopic and Carbonate Chemistry Characteristics of an Antarctic Subglacial Lake. Student Innovation Fund Awards Competition. USF College of Marine Science. St. Petersburg, FL. 11/19/2019 (collaborative talk).

[8] **Sharp, J.D.**, Byrne, R.H. Interpreting seawater alkalinity measurements in the presence of dissolved organic matter. Graduate Student Seminar Series. USF College of Marine Science. St. Petersburg, FL. 11/14/2019 (talk).

[9] **Sharp, J.D.**, Byrne, R.H. Carbonate ion determinations in seawater: A decade of methodological development. ASLO 2019 Aquatic Sciences Meeting. San Juan, PR. 2/27/2019 (talk).

[10] **Sharp, J.D.**, Hudson-Heck, E., Schockman, K.M., Tierney, C., Byrne, R.H. Acidification in the Gulf: Insights from measurements of pH and $[CO_3^{2-}]$ on GOMECC-3. 2018 Ocean Sciences Meeting. Portland, OR. 2/14/2018 (poster).

[11] **Sharp, J.D.**, Byrne, R.H. Direct measurements of seawater carbonate ion concentrations in the Gulf of Mexico: Implications for spatial mapping of $CaCO_3$ saturation states. OCB 2017 Summer Workshop. Woods Hole, MA. 7/27/2017 (poster).

[12] **Sharp, J.D.**, Byrne, R.H., Liu, X., Feely, R.A., Cuyler, E.E. Wanninkhof, R. Direct UV measurements of seawater carbonate ion concentrations: Observations and angstrom-scale adjustments. ASLO 2017 Aquatic Sciences Meeting. Honolulu, HI. 3/1/2017 (poster).

[13] **Sharp, J.D.**, Byrne, R.H., Liu, X., Cuyler, E.E**.** Direct UV measurements of seawater carbonate ion concentration: Smoothing troubled data with angstrom-scale adjustments. Graduate Student Symposium. USF College of Marine Science. Saint Petersburg, FL. 1/13/2017 (talk). ***Best Oral Presentation***

ACHIEVEMENTS AND AWARDS

2019	Aquatic Sciences Meeting Student Travel Award (ASLO)
2018	Invited Student Speaker (USF CMS Fellowships Luncheon)
2017	Best Student Oral Presentation (USF College of Marine Science)
2013–14	President's Honor Roll (University of Miami)
2011–14	Provost's Honor Roll (University of Miami)
2010	Eagle Scout (Boy Scouts of America)

ACADEMIC SERVICE AND COMMUNITY OUTREACH

2022	**NOAA PMEL Adopt-a-Float Program** Helped to prepare educational materials for teaching high school students about the Argo program.
2022	**Journal Reviews (1)**: Journal of Geophysical Research: Oceans
2022	**BGC-Argo Webinar Series** Served as an organizing committee member for this webinar series, which is sponsored by GO-BGC and the OCB Project Office

2021 **Journal Reviews (4)**: International Journal of Greenhouse Gas Control, Biogeosciences, Limnology and Oceanography: Methods, Communications Earth and Environment

2021 **Building a Community of Biogeochemistry Float Data Users Workshop**
Prepared code for workshop tutorials to inform attendees about how to access BGC-Argo float data. GO-BGC-sponsored workshop.

2021 **Proposal Reviews (1):** National Science Foundation Division of Ocean Sciences

2021 **The Global Biogeochemical-Argo Fleet: Knowledge to Action Workshop**
Recorded and synthesized notes from each session for this G7-sponsored workshop. Participated in discussion of cross-cutting themes for planning of final session.

2020-22 **Ocean Carbonate System Intercomparison Forum**
Participant and presenter for this working group, which is sponsored by the OCB Project Office

2020 **Journal Reviews (3):** Marine Chemistry (2), PLOS ONE

2018 **St. Petersburg Saturday Morning Market Ocean Education Booth**
Volunteer at a recurring public education booth sponsored by the University of South Florida College of Marine Science (Topics: ocean acidification, marine pollution).

2017 **St. Petersburg Science Festival**
Exhibitor for the University of South Florida College of Marine Science CO_2 System Chemistry Lab. Taught kids about the pH scale and ocean acidification.

2017 **NOAA GOMECC-3 Cruise Blog**
Wrote a blog post about pH and ocean acidification for the cruise: https://goo.gl/5EHkBs.

2017 **Eckerd College Marine Science Seminar**
Served on a panel that discussed applying to and choosing a graduate school with undergraduate students from Eckerd College in St. Petersburg, FL.

2016–17 **University of South Florida Marine Science Advisory Council**
Served as the Social Chair for the USF College of Marine Science student organization.

2016–17 **College of Marine Science Honors & Awards Committee**
Served as the Student Representative on the committee that assigns endowed fellowships to students at the USF College of Marine Science.

2016–17 **College of Marine Science 50th Anniversary Committee**
Served as a Student Member on the planning committee of the USF College of Marine Science 50th Anniversary celebration.

2016 **NOAA WCOA Cruise Blog**
Wrote a blog post about instrument development for the cruise: https://goo.gl/dHJyDU.

2016–17 **Spoonbill Ocean Sciences Bowl**
Served as a scorekeeper and science judge for a regional competition of the National Ocean Sciences Bowl.

2015–16 **St. Petersburg Science Festival**
Served on the Marketing Committee to plan the St. Petersburg Science Festival.

PROFESSIONAL DEVELOPMENT

2022 **Argovis Hackathon**
A three-day hackathon during which Jupyter Notebooks for accessing and plotting Argo data using the Argovis API were prepared.

2019 **The Science of Science Communication Workshop**
A day-long workshop focused on honing verbal and visual communication skills for scientists and science communicators.

2015 **COSEE Presentation Bootcamp**
Two-day workshop from the Consortium for Ocean Science Exploration and Engagement that provided training in planning and preparing presentations that communicate messages clearly and have a lasting impact on the audience

2010 **SSI Open Water Diver SCUBA Certification**
Earned certification through the University of Miami SCUBA Club.