

#### **Robert Bochenek**

Information Architect, CEO  
Axiom Data Science  
*A Tetra Tech Company*  
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Email: rob@axiomdatascience.com

#### **Role and responsibilities**

Rob is responsible for managing personnel and financial responsibilities including invoicing, and budgeting. As the CEO Rob reviews overall project progress and manages key infrastructure decisions to support the RAs.

#### **Professional Preparation**

University of Michigan Ann Arbor, MI Aerospace Engineering B.S.E., 2001

#### **Appointments**

2021 – Present	Technical Lead, Southern California Coastal and Ocean Observing System, San Diego, CA
2019 – Present	Cyberinfrastructure Team, National Science Foundation, Ocean Observatories Initiative (OOI)
2018– Present	Technical Lead for Office of Naval Research Animal Telemetry Network DAC
2017– Present	Information Manager, National Science Foundation, North Gulf of Alaska LTER Site
2015– Present	Technical Lead, Southeast Coastal Ocean Observing Regional Association, Charleston, SC
2013 – Present	Technical Lead, Central and Northern California Ocean Observing System, Moss Landing, CA
2010 – Present	Technical Lead, Alaska Ocean Observing System, Anchorage, AK
2006 – Present	CEO and Information Architect, Axiom Data Science, Anchorage, AK
2003 – 2006	Data Systems Manager, Exxon Valdez Oil Spill Trustee Council (EVOSTC), Anchorage, AK
2001 – 2002	Analyst Programmer, Alaska Department of Fish & Game, Anchorage, AK

#### **Most Relevant Products**

1. Bochenek, R.B., McCammon, M., Stone, B.J. (2019). AOOS Ocean Data Explorer. This statewide portal provides access to all of AOOS' public data, allowing users to visualize and integrate different types of data from many sources. Includes 10+ regional data portal subsets. Ocean Data Explorer: <https://portal.aos.org>; 10+ regional data portals: <http://www.aos.org/aos-data-resources/>.
2. Bochenek R.B., Vance, T., Stone, B.J. (2019). IOOS Environmental Sensor Map. Integrates regional, national, and global real-time data across the NOAA-IOOS enterprise. Connects to over 35,000 stations providing the latest information on oceanographic and meteorological conditions. Accessible from: <https://sensors.ioos.us/>
3. Bochenek R.B., Canonico, G., Stone, B.J. (2019). Marine Biodiversity Observation Network (MBON) and Arctic MBON. Pilot effort by US MBON projects and partner organizations to integrate biological observations into ocean observing systems for practical applications. Search and download real-time, delayed-mode, and historical data for in situ and remotely-sensed physical, chemical, and biological

observations. Accessible from: <https://mbon.ioos.us/>

4. Lopez, J., Austin, J., Koeppen, W. and Bochenek, R.B (2018). AIS Vessel Traffic Data Products and Arctic Oil Spill Risk Assessment (OSRA) Products. Data processing and voyage and traffic heatmap product development for raw AIS data feeds (2009-2017) and subsistence use data from the Beaufort Sea coastal communities to generate an analysis of estimated oil spill risk to these areas, Accessible from: <http://ais.axds.co>. and <https://osra.axds.co/>.
5. Bochenek, R.B., B.Stone, J. Austin (2018). Using Vessel Tracking Data to Prioritize Bathymetric Surveying in a Rapidly Changing Arctic. Collaborative effort between AOOS, Axiom, and the Marine Exchange of Alaska to support the NOAA Office of Coast Survey (NOAA OCS) to create vessel traffic and safety products for the Arctic environment. Accessible from <https://aoot.org/ais-4-bathy/> (website) and <https://pac.portal.aoot.org/> (web portal).

### **Other Significant Products**

1. Turner, C. and Bochenek, R. (2017). "Cyberinfrastructure to support data management," in OCEANS Anchorage, 2017., 2017, Anchorage, AK, [Online]. Available: <http://ieeexplore.ieee.org/document/8232392/>
2. Bochenek, R.B., R. Martin (2017), Research Workspace. Web-based platform for collaboratively managing science projects through the entire data lifecycle. Accessible from: <https://researchworkspace.com>.
3. Bochenek, R.B., Baker, B. (2019). North Pacific Research Board. Project Search & Database. This provides scientific information and data access and archive from over 700 NPRB Core Program projects funded since 2002. Accessible from: <http://projects.nprb.org>
4. Bochenek, R.B., S. StClaire, B.Stone (2012), AOOS Arctic Portal. Accessible from [http://portal.aoot.org/?v=rand&portal\\_id=3](http://portal.aoot.org/?v=rand&portal_id=3).
5. Bochenek, R.B., Wilcox, K., Lopez, J. (2019) DARPA Ocean of Things. The Ocean of Things (OoT) program seeks to provide persistent wide area ocean surveillance through a distributed sensor system composed of large-numbers of drifting nodes. Axiom supports ocean drifter data management and visualization with the goal of delivering a unified web-based portal for data exploration and distribution of various analysis products.

### **Synergistic Activities**

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|----------------|--|
| 2012 – Present | Develop and maintain AOOS Data Assembly Center, CeNCOOS Data Assembly Center, SECOORA Data Assembly Center, IOOS Environmental Sensor Map, Marine Biodiversity Observation Network Portal, Animal Telemetry Data Assembly Center, and other association products |
| 2012 – Present | Funded under the NOAA High Performance Computing program for exploratory research in applying HPC concepts to serving and visualizing gridded multidimensional models and observational data sets  |
| 2011 – Present | Member of the IOOS Sensor Observation Service standardization Committee  |
| 2010 – Present | Member of the Alaska Data integration Working Group (ADIWG) focused on developing frameworks for interchange of scientific information across Alaskan Agencies.  |
| 2008 – 2010    | Development of the Prince William Sound Data Portal, a tool for scientists, educators and the public to visualize four dimensional fisheries data  |

**Kyle Wilcox**

Sr. Software Engineer

Axiom Data Science

*A Tetra Tech Company*

Phone: 401.859.1234; Email: [kyle@axds.co](mailto:kyle@axds.co)

**Roles and responsibilities**

Kyle's role is to support SECOORA data system enhancements, provide primary technical support, and to engage with SECOORA staff. Kyle leads Axiom's development team and ensures development tasks are prioritized and completed.

**Professional Qualifications**

University of Rhode Island, Computer Science, BS 2006

**Appointments**

2013 – Present Senior Software Engineer, Axiom Data Science, Providence, RI

2009 – 2013 Software Engineer/Project Manager, RPS-ASA (formally Applied Science Associates - ASA), South Kingstown, RI

2006 – 2009 IT Specialist, NOAA Chesapeake Bay Office, Annapolis, MD

**Products and Publications**

Vance, T., Wengren, M., Burger, E., Hernandez, D., Kearns, T., Medina-Lopez, E., Merati, N., O'Brien, K., O'Neil, J., Potemra, J., Signell, R. and Wilcox, K. (2019) From the Oceans to the Cloud: Opportunities and Challenges for Data, Models, Computation and Workflows. *Front. Mar. Sci.* 6:211. [doi: 10.3389/fmars.2019.00211](https://doi.org/10.3389/fmars.2019.00211)

Wilcox, K., Stone, B. (2018), SECOORA Data Portal. Integrating heterogeneous ocean data together and making it publicly available, discoverable and accessible. Available at: <https://portal.secoora.org/>. Accessed 25 July 2018.

Bochenek, R.B., Wilcox, K., Stone, B. (2018), IOOS Environmental Sensor Map. Develop community standards for sensor observations; make regional data nationally accessible for >30,000 real-time sensors. Available at: <http://sensors.ioos.us/>. Accessed 25 July 2018.

Bochenek, R.B., Wilcox, K., Martin, R. (2018), Research Workspace. Web-based platform for collaboratively managing science projects through the entire data lifecycle. Available at: <https://researchworkspace.com>. Accessed 25 July 2018.

Vance, T., Sontag, S., Wilcox, K. (2016). Cloudy with a Chance of Fish: ArcGIS for Server and Cloud-Based Fisheries Oceanography Applications. In Wright, D. (Eds.), *Ocean Solutions, Earth Solutions* (pp. 1-24). Redlands, CA: ESRI Press.

Signell RP, Fernandes F, Wilcox K. (2016). Dynamic Reusable Workflows for Ocean Science. *Journal of Marine Science and Engineering.* 4(4):68. [doi:10.3390/jmse4040068](https://doi.org/10.3390/jmse4040068)

Wilcox, K., & Vance, T. (2015). Particle tracking in ocean and atmospheric studies. In L. Armstrong, K. Butler, J. Settelmaier, T. Vance, & O. Wilhelmi (Eds.), *Mapping and modeling weather and climate with GIS* (pp. 129-138). Redlands, CA: ESRI Press.

Vance, T., Wilcox, K., Beegle-Krause, C.J., Schroeder, M. (2013, July). Modeling marine larval behavior using enhanced technologies. Paper presented at ESRI User Conference, San Diego, CA.

Wilcox, K., Crosby, A. (2013, July). LarvaMap - A python powered larval transport modeling system. Paper presented at SciPy, Austin, TX. Available at <http://pyvideo.org/video/2074/larvamap-a-python-powered->

#### [larval-transport-mode-1.](#)

- Wilcox, K., Sontag, S. (2011, September). Bringing the oceans to life using OGC services and dynamic visualization. Paper presented at FOSS4G, Denver, CO.
- Howlett, E., Wilcox, K., Stuebe, D., Galvarino, C. (2010, June). Merging Web 2.0 Technologies with Cloud-Based Web Services to Address Ocean and Coastal Geospatial Applications. Paper presented at Com.Geo, Washington, DC.

#### **Synergistic Activities**

- 2019 – 2020 Lead architect and developer on a streaming first IoT data ingestion project through DARPA hosted on the AWS GovCloud.
- 2019 – 2020 Lead architect and developer for the IOOS Animal Telemetry Network Data Management Systems.
- 2015 – 2018 Architected systems to intelligently harvest environmental monitoring and modeling data from all around the world and standardize it under community based standards for use within the IOOS enterprise of systems.
- 2013 – 2015 Architect and lead developer of a NOAA funded larval transport modeling system designed for long running and large scale larval dispersions in Alaska and surrounding waters.
- 2010 – 2012 Managed logistics and requirements for the Dubai Coastal Ocean Observing System, including development of applications for integrating data from real-time meteorology and oceanography stations, HF radar, and video cameras.
- 2009 – 2013 Worked for the IOOS national office and two regional offices to catalog solutions for data streams and feeds, performing systems integration and support, and developing and supporting various Python libraries and tools for data access, manipulation, and visualization.
- 2009 – 2012 Planner, system architect, and developer for NOAA's Coastal Ocean Modeling Testbed.
- 2007 – 2008 Project assessment, planning, design, development, and deployment of the cyberinfrastructure currently in use by the Chesapeake Bay Observing System (CBOS) to obtain, analyze, and share observational and modeled data with the public

#### **Collaborators and Other Affiliations**

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|-------------------|---|
| Barker, Chris     | Office of Response and Restoration - NOAA, Seattle, WA                    |
| Beegle-Krause, CJ | SINTEF, Trondheim, Norway   |
| Brensnahan, Phil  | University of San Diego, San Diego, CA                                    |
| Burger, Eugene    | Pacific Marine Environmental Laboratory - NOAA, Seattle, WA               |
| Davis, Nolan      | Leidos, San Diego, CA   |
| Fernandes, Filipe | Southeast Coastal Ocean Observing Regional Association, São Paulo, Brazil |
| Jager, Bert       | Deltares, Netherlands   |
| Pye, Jon          | Ocean Tracking Network, Halifax, NS                                       |
| Signell, Richard  | Coastal and Marine Geology Program - USGS, Woods Hole, MA                 |
| Snowden, Derrick  | Integrated Ocean Observing System - NOAA, Silver Springs, MD              |
| Vance, Tiffany    | Integrated Ocean Observing System - NOAA, Silver Springs, MD              |
| Yan, Andrew       | Center for Integrated Data Analytics - USGS, Middleton, WI                |

**Lauren Showalter**

Project Manager

Axiom Data Science

*A Tetra Tech Company*

Phone: (251)-295-3590; Email: [lauren@axiomdatascience.com](mailto:lauren@axiomdatascience.com)

**Roles and responsibilities**

Lauren is responsible for overall project coordination, stakeholder communications, task tracking and reporting, and the curation of SECOORA datasets. Lauren documents all tasks, prioritizes them for the development team and tracks progress of all development, data ingestion and visualization activities.

**Professional Qualifications**

Northern Kentucky University; Highland Heights, KY; Biology; B.S., 2005

University of Alabama; Tuscaloosa, AL; Marine Science; M.S., 2010

**Appointments**

2020 – Present Project Manager, Axiom Data Science, Anchorage, AK

2016 – 2020 Program Officer, National Academies of Sciences, Engineering, and Medicine, Washington, DC

2012 – 2016 Program Manager, Texas A&M University-Corpus Christi, Corpus Christi, TX

2010 – 2012 Research Technician, Dauphin Island Sea Lab, Dauphin Island, AL

2006 – 2010 Teaching Assistant, University of Alabama, Tuscaloosa, AL & Dauphin Island, AL

**Relevant Publications**

Kathryn Sweet Keating, Melissa Gloekler, Nancy Kinner, Sharon Mesick, Michael Peccini, Benjamin Shorr, Lauren Showalter, and Jessica Henkel, 2020. "Coordination of long-term data management in the Gulf of Mexico", *Shore & Beach*88(1), 17-22. <http://doi.org/10.34237/1008812>

**Synergistic Activities**

2020 - Present Manage various projects for Axiom Data Science including the Southeast Coastal Ocean Observing Regional Association (SECOORA), Ørsted Wind Energy ECO-PAM, and Animal Telemetry Network Data Assembly Center (ATN-DAC).

2017 - 2020 Core team/organizing member of the Deepwater Horizon Long Term Data Management working group. This effort was initiated to review existing data management systems, discover opportunities to advance the integration of these systems, document the availability of data for restoration planning, project implementation, and restoration monitoring efforts, and provide a platform for increased communication among the various data Gulf of Mexico entities.

2016 - 2020 Manage data activities for the Gulf Research Program an independent, science-based program that funds studies, projects, and other activities in the areas of oil systems safety, environmental resources, and human health and well-being.

2012 - 2016 Lead a team of researchers, data specialists and computer system developers in the development of a data management system to store scientific data generated by Gulf of Mexico Research Initiative (GOMRI) researchers. Accessible from: <https://data.gulfresearchinitiative.org/>