Hawai‘i Ocean Time-series
HOT-366 Cruise Plan

Cruise ID: KM 2610
Vessel: R/V *Kilo Moana*, University of Hawai‘i
Master of the Vessel: Captain Matt Nugent
Chief Scientist: Fernando Carvalho Pacheco, University of Hawai‘i at Mānoa
Marine Technicians: Scott Nunnery, Joseph Soltis, Pete Felicijan

Marine Center phone number: (808) 956-0688
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Pre-Cruise Meeting: September 9th, 2026 at 1330 via Zoom
Loading: September 15th, 2026, at 0900, Pier 35.
Departure: September 16th, 2026, at 0900 (**Science personnel at UHMC by 0830**).
Arrival: September 21th, 2026 at 0800
Post-Cruise Meeting: September 22nd, 2026 at 1330 via Zoom

1.0 SCIENTIFIC OBJECTIVES

The objective of the cruise is to maintain a collection of hydrographic and biogeochemical data at the Hawai‘i Ocean Time-series (HOT) stations. Four stations will be occupied during the cruise, in the following order:

1) Station 1, referred to as Station Kahe, is located at 21° 20.6’ N, 158° 16.4’ W and will be occupied on September 16th for about 3-4 hours.
2) Station 2, referred to as Station ALOHA, is defined as a circle with a 6 nautical mile radius centered at 22° 45’ N, 158° W. This is the main HOT station and will be occupied September 17th – 19th.
3) Station 50, the site of WHOTS-21 Mooring (anchor position 22° 45.990’ N, 157° 54.053’ W) will be occupied for about 3-4 hours on September 19th.

1.1 SCIENTIFIC OPERATIONS

Station	Activities
Kahe (Sta. 1)	Weight Cast, Hyperpro cast, CTD cast (1000 m),
ALOHA (Sta. 2)	Sediment traps, Primary productivity array, Gas array, Net tows, CTD operations, VPR, Hyperpro
WHOTS mooring station (Sta. 50)	Yo-yo CTD (200 m), Hyperpro, surface instrument comparison
Underway/continuous	ADCP, thermosalinograph, fluorometry, meteorology, IFCB LISST-200X, AC-S, ECO fluorometer, Hyper-BB

2.0. SCIENCE PERSONNEL

Participant	Title	Affiliation	Citizenship
Garrett Licata-Portentoso	Graduate Student	UH	USA
Maggie Bradley	Graduate Student	UH	USA
Hi'ilani Mietlicki	Undergraduate Student	UH	USA
Sophia Demarco	Undergraduate Student	UH	USA
Sage Melton	Undergraduate Student	UH	USA
Leanne De Leon	Undergraduate Student	UH	USA
Amanda Laughlin	Graduate Student	UH	USA
Jessica Leaning	Graduate Student	UH	USA
Blake Watkins	Marine Engineer	UH	USA
Brandon Brenes	Graduate Student	UH	USA
Dan Sadler	Research Associate	UH	USA
Devin Hogate	Research Associate	UH	USA
Fernando Carvalho Pacheco	Research Specialist	UH	BRA
Fernando Santiago-Mandujano	Research Specialist	UH	USA
Mattia Da Fieno	Research Associate	UH	USA
Madi Davis	Research Associate	UH	USA
Mike Dowd	Graduate Student	UH	USA
Tully Rohrer	Research Associate	UH	USA
Scott Nunnery	Marine Technician	OTG	USA
Joseph Soltis	Marine Technician	Oregon State Tech Exchange	USA
Pete Felicijan	Marine Technician	OTG	USA

3.0. SUMMARY SCHEDULE

9 September	Pre-cruise planning meeting 1330 hrs, via Zoom.
15 September	Equipment loading at 0900 hrs, Pier 35.
16 September	Depart from Pier 35 at 0900 hrs. **Science personnel to UHMC by 0830.**
16 September	Station 1 Kahe Pt. operations.
16-20 September	Station 2 ALOHA operations, Station 50 CTD yo-yo cast, Station 6 Kaena operations
21 September	Arrive back at Pier 35
22 September	Post-cruise meeting at 1330 hrs via Zoom

4.0. OPERATIONAL PLANS

4.1. Station Kahe (21°20.6'N, 158°16.4'W)

A 1300 lb. weight-test cast to 500 m will be conducted, followed by a Hyperpro cast (Sect. 4.2.8. The ship's A-frame, the W2 Winch, and CTD winch will be required. After the operations are satisfactorily completed, the vessel shall proceed to Station ALOHA.

4.2. Station ALOHA (22°45'N, 158°W with 6 nm radius)

4.2.1. Upon arrival at Station ALOHA, we will deploy the Sediment Trap Array (Sect. 4.2.2). We will conduct one 1000 m CTD cast to collect water for the Primary Production Array, then deploy the Primary Production Array (Sect. 4.2.5). These will be followed by a near-bottom CTD cast and a 1000 m CTD cast to begin the 36-hour water-column observations at Station ALOHA. Transit to recover the Primary Production Array near dusk and recover just after sunset.

(*) NOTE: The deployment of all drifting arrays must be determined by observed local and forecasted currents to avoid possible entanglement with the WHOTS mooring.
Array tracking is facilitated through the SOEST Cruise and Drifter Tracks tool found at
http://hahana.soest.hawaii.edu/nowcast/loctable.html

4.2.2. Sediment Trap Array Deployment

The floating sediment traps will be from the back of the deck through the A-frame, using the SeaMac winch. After deployment, we request that the bridge verify that the radio transmitters are functioning and are directionally correct. The Sediment trap array, to be deployed on September 17th and recovered on September 19th, will consist of one cross with 12 particle interceptor traps (PIT) at 150m.

The array has 1 XEOS Iridium transmitter, 1 RockBlock Iridium beacon, strobe lights, and a radio transmitter (see section 6.0 for transmitter IDs). Assistance from the bridge is requested to plot the drift track of the array. We ask the use of the ship's radio direction finder to locate the array before recovery. **Blake Watkins** will direct this deployment.

After deployment of the sediment trap, one CTD cast shall be conducted, and the ship shall prepare to deploy the Primary Productivity Array.

4.2.5. Primary Production Array

Samples for the primary productivity experiment will be collected from the rosette. Before dawn (Sunrise 0619 hrs on September 17th), a free-drifting incubation array will be deployed from the back of the deck through the A-frame using the SeaMac winch. The primary production incubation array will be deployed within Station ALOHA. Observing local and forecasted currents will determine its location to avoid possible entanglement with the WHOTS mooring. (See section 6.0 for Transmitter IDs).

The array will be recovered around sunset (1833 hrs on September 17th). All radioactive waste generated by the experiment shall be returned to the University of Hawai‘i. Only qualified personnel shall handle radioactive material. **Blake Watkins** will direct this deployment.

4.2.6. Water column measurements

Vertical profiles of temperature, conductivity, and dissolved oxygen will be made with an instrument package consisting of a Sea-Bird CTD attached to a 24-place rosette with 12-liter sampling bottles. We will need the ship’s CTD winch and crane for these operations. Water samples for biogeochemical measurements will be collected on each cast. On September 17th, a near-bottom (approximately 4740 m) cast shall be made. Following this cast, a series of 1000-m casts shall be made continuously every three hours for a 36-hour period, ending with a second near-bottom cast.

It is highly desirable that this burst-sampling period be completed without interruption. We request that the ship maintain its position within the study area throughout this period and, whenever possible, reposition near the center of the station before each cast. We also request advance communication regarding any tank-pumping requirements, preferably with at least three hours’ notice, to avoid urgent requests that require an immediate departure from Station ALOHA.

Whenever pumping of the ship's tanks is necessary, it must be conducted outside the circle defining Station ALOHA (Sect. 1.0). To minimize disruptions to the sampling schedule, all tank-pumping operations should be coordinated in advance with the Chief Scientist or the watch leaders, **Tully Rohrer and Fernando Carvalho Pacheco**.

4.2.7. Gas Array Deployment

A free-drifting incubation array will be deployed on the fourth day of the cruise at Station ALOHA. Samples for the gas array will be collected from Station 2 CTD Cast 8. The gas array will be deployed from the back of the deck through the A-frame and using the SeaMac winch. The gas array will be deployed within Station ALOHA and determined by observed local and forecasted currents to avoid possible entanglement with the WHOTS mooring. The array has GPS transmitters, strobe lights, and a radio transmitter (See Section 6.0 for transmitter IDs). Positions of the array will be emailed to argosfix@km.soest.hawaii.edu, and the password is argosfix. The ship will not need to keep within sight of the array until the time of the recovery, approximately 25 hours after its deployment. Assistance from the bridge is requested to plot the drift track of the array. **Blake Watkins** will oversee this deployment.

4.2.8. Hyperpro

The Hyperpro is a profiling unit with one up-looking and one down-looking hyperspectral radiometer, a WET Labs ECO-BB2F triplet (measuring Chlorophyll-*a* fluorescence and backscattering in the blue and red wavelengths), temperature, and conductivity sensors. This instrument also incorporates a ship-mounted surface radiometer. Around 1300 on September 16th, 17th, and 19th, the HyperPro will be deployed from the stern via a small block on the A-frame and hand-lowered/recovered; each deployment will consist of two vertical profiles followed by one yo-yo sequence (5 cycles to 20 m), after which the instrument will be retrieved.

4.2.9. Zooplankton Net Tows

A plankton net will be deployed from the stern and towed for half-hour periods. Half-hour periods are scheduled around noon and midnight on the second and third days for six slots. The A-frame and small capstan will be needed for this operation. **Blake Watkins** will direct these operations.

4.3 Gas Array, Sediment Trap Array Recovery

On the morning of September 19th, the ship will be in transit to recover the gas array. The A-frame and the Sea-Mac winch will be needed to retrieve the array. After recovering the Gas Array, the ship shall transit to recover the floating sediment trap array. **Blake Watkins** will oversee these operations.

4.4. Station 50 - WHOTS-21 Mooring

The anchor position of the WHOTS-21 mooring is 22° 45.990' N, 157° 54.053' W. The watch circle of the buoy is about 2 nautical miles. Generally, the buoy stays on the edge of the watch circle. The buoy can be detected via radar in good weather conditions, but is harder to detect in larger sea states. Upon arrival at Station 50 on September 19th, one 200 m CTD yo-yo cast, a VPR, a Hyperpro cast, and ADCP intercomparisons will be conducted.

4.5. Acoustic Doppler Current Profiler

The ship's acoustic Doppler current profilers (ADCP) will operate throughout the cruise. The OTG technicians will oversee the ADCP system.

4.6. Thermosalinograph, Fluorometer, and pCO_2

The ship's thermosalinograph, fluorometer, and pCO_2 sampling of the uncontaminated seawater supply system will operate during the cruise while the ship is outside Honolulu Harbor. The science personnel will take salinity samples from the intake hose at 6-hour intervals throughout the cruise to calibrate the thermosalinograph. The ship's meteorological system shall be in operation throughout the cruise. Access to

real-time underway data through the ship's network will be required. The OTG technicians will oversee the thermosalinograph, fluorometer, and meteorological suite operations.

4.7. Underway Optical Instrumentation and IFCB

In addition to the continuous thermosalinograph and fluorometer sampling, the White Lab will continuously sample from the uncontaminated seawater supply system (~5 liters per minute) throughout the cruise while the ship is outside Honolulu Harbor. Instrumentation includes the Sea-Bird ECO fluorometer, Sea-Bird AC-S, and Sequoia LISST-200X and Hyper-BB instruments. The Imaging Flow CytoBot (IFCB) will also be used on this cruise, sipping from an overflowing one-liter bottle requiring a flow of 50ml/min. Access to real-time underway data through the ship's network is required. UH personnel will oversee these instruments and operations.

4.8. Video Plankton Recorder (VPR) Cast

A digital autonomous Video Plankton Recorder (VPR) will be deployed multiple times during the cruise. Tow speed 1.5 knots, payout/recovery speed 30 meters per minute using the SeaMac winch. The system should continuously oscillate between the surface and the maximum line-out depth. The orange synthetic Dyneema line shall be used for this deployment. Deployments should be at least 45 minutes in the water. A two-hour block will allow for 3 profiles. When fully charged, the batteries are suitable for 4.5 hours, so a maximum of 4 hours is reasonable.

5.0 EQUIPMENT

5.1. The HOT science party shall be bringing the following

1. Seabird CTD system, all sensors, deck boxes, and computer CTD acquisition systems
2. One 20 ft. laboratory van (#23 HOT Rad Van) with assorted equipment for radioisotope and general use, one 10x8 ft. equipment van (#540A PO Equipment Van) for equipment and spare storage.
3. Distilled, deionized water and all required chemicals and isotopes
4. Large vacuum waste containers
5. Liquid nitrogen dewars
6. Drifting sediment trap arrays (2) with strobe lights, satellite and radio transmitters, floats, weights, line, sediment traps, and crosses.
7. Drifting primary production array with strobe lights, satellite and radio transmitters, floats, weights, line primary production bottles, and spreader bars.
8. Drifting gas array with strobe lights, satellite and radio transmitters, floats, weights, line, 4 L bottles, and short mounting bars.
9. Oxygen titration system
10. Plankton nets and towing lines
11. Desktop and laptop personal computers
12. Assorted tools
13. All required sampling bottles
14. Pertinent MSDS
15. Imaging FlowCytoBot (IFCB)
16. LISST-200X
17. AC-S
18. ECO fluorometer
19. VPR

5.2. We will need the use of the following ship's equipment:

1. A-frame
2. A-frame block assembly
3. CTD winch
4. Electric power
   -440/480 VAC, 3 phase 60Hz, 60amp for winches
   -208 VAC single phase at 60 amps for lab vans
5. Space on upper 01 deck port side for one 10 ft van **(#540A PO Equipment van)**
6. Space on upper 01 deck port side for one 20 ft van **(#23- HOT Rad Van)**
7. Space on deck for ~4 deck baskets of array gear
8. Small capstan (~ 10 m/min)
9. SeaMac Winch
10. W2 Winch (for Trace Metal CTD deployment)
11. Radio direction finder
12. Hand-held VHF transceivers
13. Shackles, sheaves, hooks, and lines
14. Precision depth recorder
15. Shipboard Acoustic Doppler Current Profiler
16. Thermosalinograph, pCO_2 system, and Fluorometer
17. Meteorological suite
18. Grappling hooks and line
19. Navlink2 PC or equivalent
20. Running fresh water and seawater, hoses
21. Uncontaminated seawater supply
22. Source of compressed air for Trace Metal pump
23. -80°C Freezer
24. 4°C Refrigerator and -20°C Freezer
25. Distilled, deionized water system
26. Email system
27. GPS system
28. Underway/on-station data acquisition system for meteorological instruments, ADCP, thermosalinograph,

6.0 Satellite Position Transmitters Summary

Array Name	RockBlock ID	XEOS ID	Argos ID	Radio Frequency
Sediment Trap (ST)	06	268/88		CH.68 (156.425 MHz)
Primary Production (PP)	08	266/87		CH.69 (156.475MHz)
Gas Array (GA)	08	266/87		CH.69 (156.475MHz)
Subsea Sediment Traps	-	1411		
Wire Walker (WW)	-	77/86		

NOTE: Array tracking is facilitated through the SOEST Cruise and Drifter Tracks tool found at http://hahana.soest.hawaii.edu/nowcast/loctable.html

Ship: R/V *Kilo Moana* **HOT-366 CTD CASTS** **Date: Sept 16th - 21th, 2026**

Cast		Samples	#Bottles
Kahe Pt.			
s1c1	1000 m	O_2, Temp, DIC/Alk, pH, Nuts, LLN, LLP, Chl a, PD (3@5m), Salts	24
Station ALOHA			
s2c1	200 m	Primary Production (3@ 5, 25, 45, 75, 100, 125, 150, 175) Chl a, FCM, DIC, Salts	24
s2c2	4740 m (PO-1)	O_2, Temp, DOC, DIC/Alk, pH, Ref Si, Nuts, Salts	24
s2c3	1000 m (PO-2)	O_2, Temp, DOC, DIC/Alk, pH, Nuts, Ref Si, Salts	24
s2c4	1000 m	PC/PN, **PD** (3@5), Salts	20
s2c5	1000 m	PPO4, Salts	14
s2c6	1000 m (BEACH)	O_2, Temp, DIC/Alk, pH, Nuts, LLN, LLP, DOC, Keeling, Quay, Salt	23
s2c7	1000 m	Open, Salts	3
s2c8	1000 m	Gas Array (3@5,25,45,75,100,125), **MC** (1@5, 25, 45, 75, 100, 125, 150, 175), Salts	24
s2c9	1000 m	Open, Salts	3
s2c10	1000 m	PSi, Salts	14
s2c11	1000 m	Open, Salts	3
s2c12	1000 m	ATP, Salts	19
s2c13	1000 m	Open,**DL** (1@5,25,45,75,100,125,150,175), Salts	3
s2c14	1000 m	HPLC, Chl a, **PD** (2@5), Salts	16
s2c15	4740 m (PO-3)	Oxygen, Salts,	24
WHOTS Mooring			
s50c1	200 m yo-yo	**PD** (3@5)	5

MC=Matt Church**, PD**= Paige Dillen**, DL**=Debbie Lindell

Ship: R/V *Kilo Moana* HOT-366 Date: September 16th – 21st, 2026

TIME	Thursday 9/16	Friday 9/17	Saturday 9/18	Sunday 9/19	Monday 9/20
0000		Deploy Sed Traps			
0100					???
0200		S2C1 PP	S2C8 Gas Array		
0300				Transit Gas Array + (Pump tanks if outside ALOHA	
0400		Deploy PP Array	Deploy Gas Array	Recover Gas Array	
0500		S2C2 PO-1 (Deep) @center	S2C9 Open	Transit Sed Traps	???
0600			Transit to pump tanks + Incinerator	Recover Sed Traps	
0700				Transit to WHOTS (S50)	
0800	All Sci. Aboard		S2C10 PSi	S50C1 WHOTS	
0900	Depart Pier 35	Pump Tanks & Incinerator		VPR Cast	???
1000					
1100		S2C3 PO-2 (Begin 36 hr) @center	S2C11 OPEN		
1200	Arrive Kahe Weight Cast	Net Tow	Net Tow Net Tow	HyperPro	
1300	Hyperpro	Hyperpro		Transit to Pump Tanks	Transit to Kaena
1400	S1C1 Kahe	S2C4 PC/PN	S2C12 ATP	VPR Cast	
1500	Transit to ALOHA		Transit to Pump Tanks		
1600					
1700		S2C5 PPO4	S2C13 OPEN	VPR Cast	
1800		Transit to PP array Recover PP array			S6C1 Kaena
1900					
2000		S2C6 BEACH	S2C14 HPLC	Transit to ??	
2100	Pump Tanks & Incinerator (before arrive @ALOHA)	Pump Tanks			Transit To Pier 35
2200		Net Tow Net Tow	Net tow		
2300	Arrive ALOHA	S2C7 OPEN	S2C15 PO-3 (Deep) (end 36 hours)		

Sept 17th: Sunrise 0619, Sunset 1833
(22.75, -158; https://gml.noaa.gov/grad/solcalc/)

TIME	Tuesday 9/21
0000	
0100	
0200	
0300	
0400	
0500	
0600	
0700	
0800	Arrive Pier 35
0900	
1000	
1100	
1200	
1300	
1400	
1500	
1600	
1700	
1800	
1900	
2000	
2100	
2200	
2300	

6.0 HOT-366 Watch Schedule

0300-1500

Dan Sadler – Water Boss
Madi Davis
Michael Dowd - Console
Fernando Carvalho Pacheco - Watch Leader, Chief Scientist
Maggie Bradley
Leanne De Leon
Sage Melton
Garrett Licata-Portentoso

1500-0300

Mattia Da Fieno - Water Boss
Fernando Santiago-Mandujano - Console
Brandon Brenes
Tully Rohrer - Watch Leader
Sophia Demarco
Hi'ilani Mietlicki
Maggie Bradley

At Large

Blake Watkins
Amanda Laughlin
Jessica Leaning
Devin Hogate

OTG

Scott Nunnery (lead)
Joseph Soltis
Pete Felicijan