

# 901805 - Coastal Biogeochemical Sensing Program

## Week 52

1. Irene Hu
  - a. Continued work on alkalinity flowcell. Latest version has been tapped for Durafet, alignment is more off than expected and may iterate. Contemplating a lid.

## Week 51

1. Irene Hu
  - a. Alkalinity: Iterating on 3D printed parts for floating anode design
  - b. Getting boards ready for alkalinity tests

## Week 50

1. Irene Hu
  - a. Continued work on alkalinity sensor
    - i. Troubleshooting w/ contractor Jim's help to fix filesystem issues w/ mphox rB
    - ii. Data processing to try to extract inflection point, found faster data needs block average so might make sense just to measure slower
    - iii. Troubleshooting and calcs on current source for 2-3% error. Has to do with Howland pump nonideal behavior, will do some tests once a more precise lab setup is ready to determine how much of a problem it is
    - iv. Designed some parts in Solidworks to hold floating anode design
2. Brent Jones
  - a. Completed pcb for n channel ISFET
  - b. Prepping all 4 nanofet v2 pcb for manuf

## Week 49

1. Irene Hu
  - a. Continued work on alkalinity sensor. Code updates to speed up. Collect data and process to detect inflection points, but setup is imprecise so inflection points don't always show up. Code update for file write but FatFS seems broken. New rev B board works well but shows a consistent 2-3% error in current generation, trying to troubleshoot
2. Thom Maughan
  - a. Working with Jim Davis on v5.2 MoSoS for MFET, NanoFET, MpHOX
  - b. Reviewed Brent Jones new NanoFET hardware design

- c. Support for Irene's Alkalinity effort on MpHOX rB

## Week 48

1. Brent Jones
  - a. Working on BOM for nanoFETv2.

## Week 47

1. Irene Hu
  - a. Review nanofet 2 board design
  - b. Ordered some things for alkalinity experiment
2. Brent Jones
  - a. Design review for 3 board isolated nanofet
  - b. Mechanical integration of LioneX

## Week 46

1. Brent Jones
  - a. PCB design for 3 board nanoFET stackup
  - b. Mechanical design for nanoFET modular. Reducing overall size

## Week 45

1. Irene Hu
  - a. Alkalinity test set up in lab, produced a titration curve after some troubleshooting
  - b. Discussed Nanofet v2 w/ Brent and Yui, looked over Brent's design
2. Brent Jones
  - a. Add isolation to nanoFET2 miniature implementation

## Week 44

1. Irene Hu
  - a. ISUS data processing from ROV dive
2. Brent Jones
  - a. Redesign glider nanoFET to include power isolation
3. Thom Maughan
  - a. Minor support for MoSoS menu issue on mini-ISUS. Looks like mini-ISUS was a success on the Santa Barbara cruise, well done Irene and team.

## Week 43

1. Irene Hu
  - a. Continual monitoring of mini ISUS dev - deployed on Monday on ROV w/ DISCO dive

## Week 42

1. Irene Hu
  - a. Simulated new and old circuits with pspice, updated circuit for improved current measurement
  - b. Updated alkalinity code to handle pumping
  - c. Continued support for mini ISUS tests

## Week 41

1. Irene Hu
  - a. Chasing down inaccuracies in reported current of alkalinity circuit in ranges we care about, may need to switch circuit design
  - b. Tests of mini ISUS in seawater lab chilled line: show some temperature effects in raw data, but processed nitrate seems ok

## Week 40

1. Irene Hu
  - a. Reorg'ed code for mpHOx revB, wrote and tested alkalinity + pH code
  - b. After coordinating cables with Joe, mini ISUS 001 was deployed in the test tank. Data looked ok, still too much heating.

## Week 39

1. Irene Hu
  - a. Working version of alkalinity code; electronics confirmed to work, now cleaning up code
  - b. Mini ISUS assembled and uploaded with new fast sampling code. Trial run of 20 min had too much heating inside, will try again in test tank

## Week 38

1. Irene Hu
  - a. First draft code for alkalinity sensor, after discussing new code structure with Jim Davis. Doesn't work yet.
  - b. First draft code for ISUS fast sampling, for mini ISUS deployment on CTD
2. Thom Maughan
  - a. Advising on fast sampling for upcoming CTD cast. Sub-second nitrate sensing. Irene is doing the coding as I'm out of hours.

## Week 37

1. Irene Hu
  - a. Check in on mini ISUS- one fiber is a little too short
  - b. Mphox rB broke, waiting for rC to test alk board

## Week 36

1. Irene Hu
  - a. Updated code for alkalinity and fixed some compile errors; trying to debug an mphox rB for testing
2. Thom Maughan
  - a. Working with Jim Davis on MoSoS v5.2
  - b. Supporting Irene's work on alkalinity using MoSoS v5.2 on MpHOX. Finding issues with the rtc / hib backup battery.

## Week 35

1. Irene Hu
  - a. OSM abstract
  - b. Alkalinity board received, working on code integration with updated mpHOx code

## Week 34

1. Thom Maughan
  - a. Working with Jim Davis

## Week 32

1. Thom Maughan
  - a. Working with Jim Davis on MoSoS v5.x support for Carbon lab platforms

## Week 31

1. Irene Hu
  - a. mALK board sent out, working with Jose to update mphox revC
2. Brent Jones
  - a. Assisting in rebuild of Spray29 hydraulic system

## Week 29

1. Irene Hu
  - a. Checked over phAt board layout and approved!
2. Thom Maughan
  - a. Working with contractor Jim Davis to update MoSoS v5.2.x for support of Tiva 123g based hardware platforms, MpHOx, MFET and nanoFET.

## Week 26

1. Irene Hu
  - a. BME280 errors on mini ISUS baseboard traced to soldering issues. Baseboard checks out again, succeeded in running overnight scans
  - b. Pushing through mini ISUS parts orders

2. Thom Maughan
  - a. Modified phfetsos v4.2.4 to ensure cr-lf transmit prior to sleep for LRAUV integration. Sounds like other problems encountered so a switch to polled mode is likely.

## Week 25

1. Irene Hu
  - a. Working with Joe on getting lamp attached to mini ISUS baseboard for first prototype build

## Week 24

1. Irene Hu
  - a. Mini ISUS build BOM
  - b. Start organizing to order boards for mini ISUS, mods as needed

## Week 23

1. Irene Hu
  - a. Finished first draft of alkalinity board
  - b. Breadboard test of negative current source, worked
  - c. First draft of code for ADC and DAC

## Week 22

1. Irene Hu
  - a. Alkalinity board: tests with electrodes in NaCl water, finished board design

## Week 21

1. Irene Hu
  - a. Presentation on electronics for lab meeting

## Week 20

1. Brent Jones
  - a. Mechanical design of NanoFET v2
  - b. Spray code tweaks

## Week 16

1. Brent Jones
  - a. Mechanical design for nanofet

## Week 15

1. Irene Hu
  - a. Latest issues with mini ISUS prototype traced to using unprogrammed spec boards in assembly. Fixed this and finally got a scan! (Scan has a blip)
  - b. Worked through process for programming spec digital boards. Worked with Ben a little on MSC3 code he needs for tuning analog boards.
2. Brent Jones
  - a. Working on mechanical design for NanoFET2

## Week 14

1. Irene Hu
  - a. Tested breadboard alk circuit using resistors for load, plotted data
  - b. Made connectors for mini ISUS; testing and troubleshooting. 50pin header is reversed and one baseboard seems to have assembly errors

## Week 13

1. Irene Hu
  - a. Prototyped alk circuit on breadboard

## Week 12

1. Brent Jones
  - a. Laying out digital nanofet board

## Week 11

1. Irene Hu
  - a. Mini ISUS fit test reveals backwards connector
2. Brent Jones
  - a. Analog nonisonanofet pcb rough draft complete
  - b. Begin work on digital nonisonanofet pcb layout

## Week 10

1. Brent Jones
  - a. Split nanoFET pcb board into two (Analog and digital) to repackage in smaller housing
  - b. Circuit drawn up in KiCAD
  - c. Working on analog pcb layout in KiCAD

## Week 9

1. Irene Hu
  - a. Outline of alkalinity circuit, ordered things for breadboard experiment

2. Brent Jones
  - a. Flying Spray29 in support of Yui experiments
  - b. Moving noniso nFET from orcad to KiCAD so a different layout can take place

## Week 8

1. Irene Hu
  - a. Discussed alk sensor with Ellen during her visit, handed her boards
  - b. Started on alk circuit

## Week 7

1. Irene Hu
  - a. Mini ISUS baseboard finished and sent out for quotes

## Week 6

1. Irene Hu
  - a. Non-iso nano is ordered and on its way
  - b. Finally got mini lamp info after Photonics West meetup. Updated circuit for mini ISUS baseboard, Jose went back and forth with Jon re: layout
  - c. Continue trying to understand alkalinity circuit
2. Brent Jones
  - a. Meetings
  - b. Beginning to look at repackaging nanoFET

## Week 5

1. Irene Hu
  - a. Coordinated w/ Jon about Mini-ISUS layout specs
  - b. Reviewed more resumes
  - c. KAUST call

## Week 4

1. Irene Hu
  - a. Trying to get together boards and package to send to Ellen Briggs at Scripps for Alkalinity sensor; troubleshooting some issues with bad signals (cable was backwards)
  - b. Working w/ Jose on non isolated Nanofet board
2. Brent Jones
  - a. Code updates to incorporate firmware versioning, seabird pump turn on at various times, etc

## Week 3

1. Irene Hu
  - a. Reviewed alk circuit again, talked to Ellen Briggs (Scripps), reviewed materials she sent
  - b. Working on getting lioncap and NC-Nanofet to Ellen- need to check out boards
  - c. MiniISUS: trying to figure out what's going on with lamp (model in hand doesn't match documentation in hand) before can proceed
2. Brent Jones
  - a. Moving start of descent pH sampling to minimum 2m depth. Dont want to suck in surface junk

## Week 2

1. Irene Hu
  - a. Reviewed alkalinity sensor documentation
  - b. Mini ISUS baseboard recreated as modification of MSC3 baseboard revD
  - c. Interview for research specialist position

## Week 1

1. Thom Maughan
  - a. Jim Davis has finished his contract and has preliminary support for MoSoS v5.2 command line on nanoFET, MFET and MpHOX. I've got several weeks of implementation and test before releasing v5.2 for use in Yui's projects.
  - b. Support Alkalinity sensor has been mostly handled by Jim.