

Kevin Barnard Sorted By Project

200103 - Core CTD Data - MDUC

- Caught up on QC flags up to Doc Ricketts 1411 and Ventana 4382 (Week 1)
- Set O2 sensor QC flags for several dozen dives (Week 2)
- Got coredata login set up for CTD servlet maintenance (Week 5)
- Restarted CTD servlets after IS server patch (Week 5)
- Caught up on ROV CTD QC flags through Doc Ricketts 1424 (Week 11)
- Investigated impact of clogged O2 sensor on loaded CTD data; no issues (Week 12)
- Caught up on O2 QC flags for dives through: (Week 18)
 - Doc Ricketts 1438 (Week 18)
 - Ventana 4393 (Week 18)
- Resolved missing ancillary CTD data in VARS for V3750 (Week 24)
- Received several dives of CTD QC (Week 29)
- Caught up on Ventana and Doc Ricketts O2 QC (Week 30)
- Investigated issue with Ventana 4401 missing CTD data on upcast (Week 30)
- Generated CTD plots for Doc Ricketts 1444-1447 (Week 31)
- Investigating issues with CTD load/processing (only affecting a couple dives) (Week 43)
- Caught up on O2 QC (Week 43)
- Preparing transition to Karen Salamy (Week 43)
- Kept probing into CTD processing issue; negative values generated for O2 cause script to crash (Week 44)
- Writing up transition docs (Week 48)
- Resolved D1449 bad O2 values; loaded O2 = NULL and secondary O2 as-is (Week 51)

200105 - Core Navigation Data - MDUC

500055 - VARS, M3/RS, DSG

- Started a deep dive into learning Scala 3 (Week 1)
- Implemented draggable association buttons in VARS annotation UI; PR submitted (Week 11)
- Fixed/augmented Annosaurus Swagger schema document (Week 16)
- Continued updating Annosaurus OpenAPI spec (Week 17)
- Experimented with stoplight.io for generating & managing API docs (Week 17)
- Finished Annosaurus OpenAPI spec: mbari-media-management/m3-api-docs (Week 18)
- Several BoxJelly improvements/fixes (Week 24)
- Wrote documentation for BoxJelly install & usage; awaiting IS fix before deploying to docs.mbari.org (Week 24)
- Wrote BoxJelly docs: docs.mbari.org/boxjelly (Week 25)
- Several improvements (Week 25)
 - Ported to PyQt6 (6.3 non-LTS) (Week 25)
 - Better error handling (Week 25)
 - More settings (Week 25)
- Began integration with Deep Sea AI database; currently working as read-only view (Week 25)
- Completed initial integration of BoxJelly with Deep Sea AI GraphQL API (Week 26)
- Set up CVision AI model server, serving new (benthic + midwater) model trained on MBARI data at <http://prometheus.shore.mbari.org:8082> (Week 44)
- Working on Python client for Sharktopoda 2 video player spec (Week 46)
- Integrated VARS GridView with Beholder (for non-framegrabbed localizations) and Raziel (configuration server); published on PyPI as `vars-gridview` (Week 46)

- Working on Sharktopoda 2 Python client controller (Week 48)
- Worked on implementation of Sharktopoda 2 Python client controller (Week 49)
- Started updating Cthulhu to use new UDP-only video player remote control spec (Week 50)

701139 - ML Tracking

- Forming data analysis database for LCM log files (Week 2)
 - Wrote script to auto-generate Postgres schema from LCM type descriptors (Week 2)
 - Spun up GraphQL interface via Postgraphile (Week 2)
 - Wrote loader script to populate database from log file (Week 2)
- Collected & parsed stereo cam localizations from several MiniROV dives; preparing for load to VARS (Week 6)
- Preparing stereo cam framegrabs/localizations for ingest to VARS; tracking down several videos that failed to load (Week 7)
- Uploaded stereo camera framegrabs for Mini ROV dives 127-129, 149-155 (Week 8)
- Wrote vars-kb-model-resolve to facilitate specification of ML model classes from sub-trees of VARS KB concepts/parts (Week 8)
- Loaded ~23k new localizations from ML-Tracking footage into VARS (Week 9)
- Pulled down new 48k image set for midwater object detector training (Week 9)
- Finished up dfg-tool for digital video framegrabbing (Week 9)
- Started loading 2019/2020 deployment logs into analysis DB (Week 15)
- Parsed July 2021 ML-Tracking LCM log data to JSON; will load into Postgres DB (Week 16)
- Hunted down some missing & overwritten LCM types; working to parse more LCM logs (Week 17)
- Parsed some more ML-Tracking LCM logs to JSON (Week 18)
- Started generating visualizations of May 2021 deployment data (Week 19)
- Continued analysis of May 24-25 data; working on generating visualizations of track information (Week 20)
- Reviewed track information from May 2021 data (Week 21)
- Started generating visualizations of successful tracks in Discovery mode (Week 21)
- Working to unify detection, tracking, and vehicle LCM events (Week 22)
- Started writing track visualization code (Week 23)
- Working to reconstruct unlogged data for analysis (Week 23)
- Wrapping up analysis work of May 24-25 deployments (Week 24)
- Re-ran CVision AI tracker; extracted full set of tracks from LCM logs (Week 24)
- Wrapped up May 24-25 analysis work to hand off (Week 25)
- Wrapped up all data and code for May 24-25 analysis (Week 26)
- Provided i2MAP transect images/localizations to OWOD group (Week 34)
- Data analysis for Science Robotics submission (Week 37)
- Submitted manuscript to Science Robotics for special issue on “autonomous robots for exploration & beyond” (Week 43)
- Looking for cs.RO arXiv endorsement (Week 46)
- Preparing submission to Nature Communications (Week 49)
- Preparing submission to Nature Communications (Week 50)
- Submitted paper to Nature Communications (Week 51)

800139 - EyeRIS (Remote Imaging System)

901221 - Midwater Time Series

901915 - Improving the Impact of MBARI's Data

902002 - FathomNet

- Started preparing materials for project update and workshop (Week 2)
- Looking into better workflow to accelerate process of updating exemplary images in VARS KB (images that show up in DSG for a particular concept) (Week 2)
- Towards BoxJelly/Cthulhu integration: ported ZeroMQ localization controls to Python sharktopoda client library (Week 3)
- Planned YOLOv5 inference rerun on existing framegrabs to estimate prediction confidence (Week 3)
- Integrated vars-localize with Raziel for VARS login; vars-gridview is next (Week 3)
- Met with Simon-Martin Schröder to discuss MorphoCluster & brainstorm application to FathomNet (Week 4)
- Finished integration and testing of vars-localize + Raziel (Week 4)
- Continued development of sharktopoda-client-py toward BoxJelly + Cthulhu integration (Week 4)
- Working on correspondence between inference confidence numbers over ML evaluation set and ML database bounding box associations (Week 4)
- Concluded YOLOv5 output confidence correspondence with reviewed bounding boxes in ML DB (Week 5)
- Implemented UDP video control and ØMQ localization control toward integration of BoxJelly and Cthulhu (Week 5)
- Upgraded fathomnet-py with support for image tag CRUD operations; released v0.4.1 (Week 6)
- Continued integration of BoxJelly with Cthulhu (Week 6)
- Revived dfg-tool codebase for automated digital video frame grabbing; modernizing and testing prior to video lab use (Week 6)
- Reworked dfg-tool architecture; testing and preparing to hand off to VL (Week 7)
- Released vars-localize with Raziel integration (Week 7)
- Upgraded vars-localize and vars-gridview to support Python 3.10 & Qt 5.15+ (Week 7)
- Started Colab notebook for FathomNet workshop to demonstrate Python client API (Week 10)
- Started Twitter bot for FathomNet outreach (Week 10)
- Finished implementation of sharktopoda-client-py; testing client localization sync between BoxJelly and Cthulhu (Week 10)
- Preparing FathomNet project update & workshop materials (Week 11)
- Finished writing the plumbing for the FathomNet Twitter bot (Week 11)
- Gave project update 3/21/2022 (Week 12)
- Finished preparing workshop materials for Python API demonstration (Week 12)
- Finished preparation of material for FathomNet workshop (Week 13)
- Implemented sorting by timestamp in vars-localize for midwater localization effort (Week 13)
- Presented the fathomnet-py Python API in the FathomNet workshop (Week 14)
- Converted Twitter bot to Apache Airflow DAG (Week 14)
- Continued development of FathomNet Twitter bot (Week 15)
- Wrote box-diff for image set comparison (Week 15)
- Started writing loader for corrected ML proposals in ML database → VARS (Week 15)
- Prepared initial data for FathomNet game prototype (Week 15)
- Patched timecode issue in vars-gridview (Week 16)
- Completed box-diff for localization difference analysis/ML to VARS DB merge (Week 16)
- Wrote script for ML → VARS merge (Week 17)
- Ran IoU experiments against ML/VARS localizations (Week 17)
- Completed and dockerized FathomNet Twitter bot; awaiting deployment (Week 18)

- Implemented keras-model-client, a Python client for running images through a remote FastAPI model server (Week 19)
- Deployed FathomNet Twitter bot on Eione (Week 19)
- Met with VIAME and BIIGLE to discuss potential interactions with FathomNet (Week 20)
- Started working on Medium article for FathomNet-compatible image serving solutions (Week 20)
- Pulled down all localizations and corresponding images from VARS and ML database into Pascal VOC for model training (Week 21)
- Improvements to the FathomNet Twitter bot (Week 28)
 - Custom image URL handling (Week 28)
 - Slimmed Docker image (Week 28)
 - Ran on JWST first images (Week 28)
- Generated concept → class mappings for midwater model to be trained by CVision AI (Week 28)
- Worked through some issues with merged bounding boxes (Week 29)
- Resolved issues with CVision AI model server (Week 29)
- Minor improvements to vars-localize (Week 32)
- Set up seminar at CSUMB in December via the ENSCI dept. (Week 34)
- Re-generated midwater dataset for CVision AI model (Week 37)
- Implemented sort by central region average hue and depth in vars-gridview (Week 43)
- Modified Twitter bot to use new model/model server (Week 44)
- Discussed 2023 tasks (Week 46)
- Added explicit embargoed concept check to Twitter bot (Week 48)
- Handling submission from Alexa Runyan (Week 48)
- OVAI program manager interviews (Week 48)
- Conducted OVAI program manager and engagement coordinator interviews (Week 49)

902005 - VARS Annotation Assistance

- Implemented several track editing features in BoxJelly (Week 1)
- Figured out CloudWatch log insights for visualizing logged time series data in the AWS console (Week 1)
- Finished implementation of track split, batch rename, and merge features in BoxJelly (Week 2)
- Met with Danelle and Duane to review ML object track proposals in new web dashboard and BoxJelly (Week 3)
- Met with team for internal project updates on production workflow, detect+track experiments, BoxJelly status (Week 6)
- Ran comparisons between several modes of ML inference to check for differences in data products (Week 10)
 - YOLOv5 detect.py with/without –agnostic-nms (agnostic non-maximum suppression) (Week 10)
 - PyTorch Hub model backbone vs. YOLOv5 codebase (Week 10)
- Ran several trial detection+tracking jobs on AWS SageMaker to tease out any differences in output between deepsort-yolov5 codebase versions (Week 11)
- Looked into ReID/OSNet training (Week 12)
- Investigated alternative Qt-compatible video decoder plugins/playback frameworks (Week 14)
- Continued investigating slow video playback on MacOS (Week 15)
- BoxJelly/Cthulhu integration now working; still needs polishing before release (Week 16)
- Continued to polish BoxJelly + Cthulhu integration (Week 17)
- Worked with Carlos R. on BoxJelly/Cthulhu setup (Week 18)
- Completed BoxJelly/Cthulhu integration (Week 19)
- Implemented several BoxJelly features to prepare for VL introduction (Week 20)
- Several new features/fixes to BoxJelly + Cthulhu (Week 21)
 - UI for persistent app settings (Week 21)
 - Track timeline view selection/seeking (Week 21)
 - Cthulhu highlight on track select (Week 21)
 - Read/write deepsea-track artifacts (Week 21)
- Wrote API spec for CVision AI FastAPI object detection model server (Week 43)

- Wrote StrongSort to custom visual event conversion script (Week 43)
- Looking into setting up model server proxy service (Week 43)
- Started investigating automation of Deepsea AI DB tracks → VARS annotation load process (Week 46)
- Working on automating Deep Sea AI track → VARS annotation load process (Week 49)

902012 - Telepresence on MBARI Research Vessels

- Met with the team to onboard, will assume some Vue development tasks from Kevin G. (Week 3)
- Reviewed Google drive materials (Week 3)
- Reviewed web UI mockup with Kevin G., looking into available Vue libraries & frameworks (Week 5)

902204 - Scalable Marine Robotics Foundations

- Created two Python/OpenCV tool libraries: cv_tools_detection and cv_tools_calibration (Week 28)
 - Integrating previous code (Week 28)
 - Feature detection: ORB (Week 28)
 - Feature matching: FLANN (Week 28)
 - Homography/motion estimation: essential matrix decomposition (Week 28)
 - Mono/stereo camera calibration (Week 28)
 - Calibration validation (Week 28)
 - Calibration visualization (Week 28)
 - Writing new code (Week 28)
 - AprilTag-based motion estimation (Week 28)
 - Modular feature detection → matching → homography estimation → camera motion estimation pipeline (Week 28)
 - Utilities for file IO, image manipulation, etc. (Week 28)
- Set up BitBucket pipelines for unit tests, package builds, docs (Week 28)
- Started integrating stereo camera calibration workflow (Week 29)
- Continued development of stereo camera calibration library (Week 30)
- Implemented stereo motion estimator via point cloud registration of triangulated matched keypoints (Week 30)
- Workshop with GIM re: Stella VSLAM + IMU integration (Week 30)
- Finished initial stereo motion estimation framework (Week 31)
- Rewrote chessboard corner correspondence clustering code (Week 31)
- Started evaluating Kimera-VIO as alternative framework for visual-inertial SLAM (Week 31)
- Started a deep dive into Kimera-VIO (Week 32)
- Working to evaluate Kimera-VIO out of the box on the PNW dataset (Week 32)
- Continued development of stereo calibration library (Week 32)
- Got Kimera-VIO working on simulated dataset (Week 34)
- Evaluated RTAB-Map for stereo-based SLAM (Week 37)
- Continued support for GIM Robotics introduction to Kimera (Week 37)
- Working on stereo camera calibration for Mola AUV (Week 44)
- Diving into RTAB-Map SLAM with filtered IMU + DVL measurement for visual-inertial odometry (Week 46)
- Investigating additional factors (e.g. absolute depth factor) in GTSAM backend graph optimization (Week 46)
- Tried running stereo calibration on Mola test tank images (Week 46)
- Evaluated & validated GIM RTAB-Map code modifications (Week 48)
- Tested RTAB-Map performance with different feature detectors (Week 48)
- Attempting to calibrate Mola AUV stereo cameras and 4K camera (Week 48)
- Performed in-air intrinsic and extrinsic calibration of Mola AUV cameras (Week 49)
- Prep work for SLAM demo cruises (Week 50)
- Prep for cruise (canceled) (Week 51)
- Ran online SLAM with OI sled in test tank (Week 51)

Out of Office

- Vacation 2/22/2022
- 3/18/2022, taking care of father post-op
- Marine Imaging workshop Oct 3 - 7 2022 CEST Brest, France (GMT+2)
- Vacation Oct 8 - 23
- Vacation 10/31-11/1
- Thanksgiving week; Nov 21-25
- RC cruises 12/5 and 12/6
- RC cruises 12/19 and 12/20
- Vacation 12/27-12/29

Overhead

- Moved offices, B208.07 → B208.24 (Week 24)
- Proposals (Week 28)
- AWS workshop (Week 34)