Research Log 2020

1.2.20 – 1.3.20

First couple of days as faculty at UH Manoa. Logistics and onboarding. If I'm a good person I'll write down the details of the onboarding process so new faculty can follow this checklist

1.6.20 – 1.10.20

Defined NASA EPSCoR proposal and first draft of summary

Meetings with HSFL and Luke to get involved with the team/Hawaii Space Grant. Deputy Director and possible successor to Director

Started STEM engagement Artemis proposal, onboard Amber

Read ROSES ARROW proposal, attempted collaboration. deadline too soon. Talking to marine roboticists

New faculty onboarding checklist

Submitted IEEE TAS finite dimension manuscript

1.13.20 – 1.17.20

Emailed tons of NASA JPL roboticists, gaining traction on collaborator

Refined EPSCoR NOI and submission to Luke

Artemis Proposal Draft 1 nearly finished

Booked travel for JPL in January and Space Grant in February

1.18.20 – 1.24.20

Artemis Proposal Draft 1 and rubric. Internal review and sent to Luke, Trevor, and Miguel

EPSCoR Proposal Requirements, Outline, To Do List, and Design of Activities

Modified website to include recent activities, media, and presentations

Read Shuai's ISRU workshop findings

1.27.20 – 1.28.20

JPL Visit. Secured Mike Paton as an AXEL EPSCoR proposal collaborator. Secured Justin Koch as BRUIE collaborator. Follow up on lava tube system exploration and mapping

Read NASA Taxonomy and recorded fields of interest in Edge of Space Research xlsx

Initial EPSCoR Budget

1.29.20 – 1.31.20

EPSCoR proposal Data Management, Introduction and Background, Goals, Current Capability

Finalized Artemis proposal body and budget

Read through Gaussian Process chapter in Murphy's Machine Learning textbook

2.3.20 – 2.7.20

Submitted NASA Space Grant Artemis STEM Engagement Proposal

Submitted abstract to smallsat: Low-cost 1U cubesat kit and course development for undergraduate classrooms

EPSCoR science investigations, halfway through methodology

Absorbing NASA ECF call by creating folder, notes, outline, and idea matrix

Attended From Local to Global Machine Learning workshop, met Monique, June, Susanna

2.10.20 – 2.14.20

Finished EPSCoR methodology, implementation, personnel, achieving NASA's goals, and metrics for success, biographical sketch, current and pending support, budget narrative, facilities and equipment. Finished the first draft!

Added to Song's NSF CPS underwater robots proposal, biosketch, collaborator and affiliations

2.17.20 – 2.21.20

Refined EPSCoR draft after initial review, updated budget with cost-sharing and Luke's contributions

IEEE TAS finite dimension manuscript accepted! And final files submitted

Wrote Undergraduate Research Opportunities Program Faculty Mentoring Program Software, Structures, and Avionics proposals. Reconfigured to hardware and software

Updated Edge of Space Research with NIAC, NASA ECF, and DARPA YFA

Shortened and refined NASA EPSCoR

Wrote NASA ECF NOI, draft 1

2.24.20 – 2.28.20

Finished NASA ECF NOI and submitted to NSPIRES

Submitted Undergraduate Research Opportunities Program Faculty Mentoring Program Hardware proposal. Software proposal with Trevor

Officially affiliated with Mechanical Engineering, L3 appointment

Talked to Hawaii reps and senators about Space Grant. Attending National Space Grant Spring Meeting. Networking, creating collaborations, learning about the position and opportunities

Modified EPSCoR budget and input budget in NSPIRES

Onboarded Bridget's ESVI mentor group and reviewed student applicants

3.2.20 – 3.6.20

Updated website to include Alvin and NASA Space Grant

Finite Dimension letter accepted for publication

NASA ECF Overview Chart, Design of Activities, Introduction and Background, Goals, Personnel, Letters of Collaboration, Methodology

Helped Eric with ADCS testbed in clean room

Confirmation of undergraduate mentee through ESVI REU

Travel grant to In Situ Science of Ocean Worlds to JPL accepted -> Coronavirus postpones

3.8.20 – 3.13.20

Helped Lloyd in the clean room to run thermal vacuum test

ESVI and HSGC undergraduate project descriptions

NASA ECF Implementation, TRL summary and transition, Department Letter, Budget and Narrative, injected Lauren's science, pared to correct number of pages. Filled in little things in NSPIRES

Reread EPSCoR for language. Submitted EPSCoR through ORS

Applied to be an astronaut

3.16.2020 – 3.20.2020

Entered ECF budget into NSPIRES. Assessing the quality of ECF proposal to rubric

Wrote about Pain Points at UH Manoa

Made presentation about how machine learning relates to my research but postponed meeting
Modifying NNX manuscript. Finished addressing Silvia's comments. Spoke to Dongheng about graduation requirements. Shortened paper by 9 pages.
Spoke to PlanetLabs representative about deep space DEMs. Pushback due to orbit logistics
Read the Air Force Young Investigator Call
Started UH News story about HSFL

3.23.2020 – 3.27.2020

Proofread NASA ECF call, SOA and Innovations chart, trying to define preliminary work. Added Metrics of Success. Addressing Zhuoyuan's comments.

My Lab Group Budget formulation by category of expense and by project. Cost to run business

Submitted final proof to Finite Dimension paper

Long emails discussing interpretable NN with Brian Powell

Talked to Dongheng about convnets and bouncing ball toy case

Started literature review on 'interpretable' or 'explainable' neural networks. Abstracts and impressions for initial set summarized

Artemis proposal got funded!

3.30.2020 – 4.2.2020

Prioritized XAI literature review, surveyed and selected six papers for full length read, summarized in google drive folder. Chosen more papers to read. Chatted with Brian

Downloading GPyTorch and LRP toolbox for implementation

Submitted all conference and journal preprints to engrxiv and arxiv. Accepted

Chatted with Dr. Bill Goodman about Additively Manufactured, Ultra-Stable RoboSiC Imaging Telescope for CubeSats. Biosketch and plans for HSFL

4.6.2020 – 4.10.2020

Reading five more papers about XAI

Ramping up Artemis work by settling personnel, project initiation tasks

N1 System Integration review panel

Submitted NASA ECF proposal

Half page COVID Stimulus Pitches submission to Rob Wright, then Brian Taylor

4.13.2020 – 4.17.2020

Air Force Young Investigator Program one pager, sent to Riecken and Blasch

Cubesat kit comparison of parts for competitors, relation to our own kit's goals and sacrifices

Initial plans for EPET 302: Spacecraft Mission Design and Lab

Reviewed and annotated VIP PONO PDR report

Read Linares Polynomial Chaos and Gaussian Mixture Model paper

Artemis project handbook, aimed to onboarding students

4.20.2020 – 4.24.2020

Artemis kit requirements and student application form

AXEL dynamics equations of motion, translation and rotation

VIP Ke Ao ADCS chat and mini lesson

Assisting clean room activities surrounding N1

4.27.2020 – 5.1.2020

Coded AXEL dynamics and verifying model, realized friction model is too simple and not displaying intuited dynamics

Set up google folder and proposal skeleton, schedule for NOAA OER OAR

Kala'i mentorship introduction

VIP Ke Ao ADCS chats

UH UT Aerospace Collaboration ball rolling

Doga Teaching Q&A

N1 system integration review try 1

5.4.2020 – 5.8.2020

AXEL animation of rigid bodies, applied tension constraint for 0 forward motion (sort of works but cyclic derivation), anchor point tied to inertial frame, position and velocity vectors of wheels, verification of new modifications. Theta_z rotation from wheel torque does not work, TO DO

VIP CDR, student application review and recruitment, Artemis press release publicity, strategic partner notification,

UH Aerospace program development internally and externally with UT, listserv, capabilities statement

NOAA OAR OER webinar and proposal group brainstorming

Collaborator contact book and collaboration topics owed

5.11.2020 – 5.15.2020

HSFL RCUH Avionics and Software Engineer Job Descriptions

NASA Formal Methods Workshop talks, motivated by Sriram Sankaranarayanan's conformal dynamics model talk to finished NNX paper

Sea Grant / Space Grant Meeting to discuss future collaborations

Artemis Ke Ao CDR slide conversion to Kick Off Meeting Slides, read CDR report

N1 system integration delta review

NOAA OAR OER AUV platform survey and pre-proposal meeting, fold Mike in

Brian's ML idea notebook, curve fit Lorenz data with train a neural network in the PyTorch package, validate sufficient prediction accuracy

NNX paper, updated Introduction and made section 2 even more succinct

Subsurface mobility and manipulability white paper for planetary science decadal survey, drawing from my own proposal texts

Sexism in the Academy, led women in SOEST and women in AI discussion groups

5.18.2020 – 5.22.2020

Meetings: Artemis Kick-Off, PyCubed, HSFL Website, UH Aerospace (website)

Reinstall Anaconda, Install Keras and Tensorflow, all towards training a NN for Brian's Lorenz data. Finished training, verification, and gradient derivation

Updated NNX paper and sent it to Kyle and Chelsea

Subsurface mobility and manipulability white paper for planetary science decadal survey, reach out to other scientists, summarize my own text

ARL Lightning Talk presentation slides

DOD EPSCoR outline

5.25.2020 – 5.29.2020

Read two Sriram papers on polynomials and verification

Modified Ocean Mind and Robot Slave Keck Foundation 1-pager

Meetings: HSFL Website, CISpec H-TIDeS proposal, Keck, NIAC about rocket plume condensate

DoD EPSCoR schedule and action items

Artemis, get students situated on campus, open source ADCNS sim survey, CDR

ARL presentation script, practiced, clocked at 6 minutes, add more script

Program Evaluation, detailed process for UH Aerospace

CISpec H-TIDeS call notes, outline, schedule

6.1.2020 – 6.5.2020

Meetings: Artemis Strategic Partners Meetings 1 & 2, UH aerospace, HSFL Website

Proposals: NIAC, set up proposal folder, DEPSCoR, look into projects PO has funded HIGP presentation, ARL Lightning Talk Presentation

First draft of Planetary Science White Paper on subsurface exploration technology

open source ADCNS sim trade study. Installed and ran poliastro in 1 hour. Trying to install COSMOs, 2 hours still

Tenure Dossier meeting, inspired to create advocacy, service, exposure, and proposal log. Update on a periodic basis, every 6 months?

Chaired HIGP tenure promotion criteria review committee

6.8.2020 – 6.12.2020

Contributed to Azimov's M-STAR planning proposal

Finished HIGP seminar slides, delayed for #Strike4BlackLives

Meetings: HSFL website, HSGC leadership, HSFL/UH Aerospace, CISpec, Strike4BlackLives, Artemis Student Challenge Kick-Off with high level stakeholders, ISISpace, N-1 Pre-TRR

Installed and built COSMOS

Reviewed Craig Opie's HSGC URI proposal, guide Kala'i

Wrote first draft one-pager on "Creation of Space Science and Technology PhD Program"

6.15.2020 – 6.19.2020

Artemis: End User Form, reached out to states that have not yet launched, ADCS sim study, CDR

Learning about the internal structure of COSMOS

DoD HBU instrumentation budget, CV

HSGC graduate program revamp

PISCES newsletter about microgravity flights

Meetings: N1 review, UHM Aerospace, HSFL website, N1 TRR, Online Collaborative Training and Workgroup Labs (Collab Labs) for online teaching,

Edited SST program one-pager, submission to Rob

HIGP intro to research talk

6.22.2020 – 6.26.2020

Steadily making my way to NASA OEPM report for HSGC

Editing NNX paper to address Chelsea's comments, sent out draft to Silvia, Fred, Dongheng

Read NASA roadmaps to Ocean Worlds

Meetings: Online Collaborative Training and Workgroup Labs (Collab Labs) for online teaching, Bruce Howe Seagliders, DARPA Discover Day, StemWorks, NIAC Propellant Recycling, StemWorks Orientation

NOAA OAR OER two-page letter of intent submission

Submit abstract to IEEE Aerospace about Artemis CubeSat kit

Submit DoD MSI Instrumentation IfA optics lab proposal

Keck one-pager submission

Reviewed abstracts for IEEE aerospace conference UAV systems and autonomy

6.28.2020 – 7.2.2020

Update Tenure Dossier logs for Proposal, Papers, Presentations, Service

Reformat NNX paper into IEEE TNNLS template, from tables in Latex to images

Assisting with HIAPO hackathon, onboarded StemWorks interns

NIAC overview chart, literature review, Alvin evaluation, budget, outline of work

Reviewed abstracts for IEEE aerospace conference UAV systems and autonomy

Goodman NASA SBIR proposal, Additively Manufactured, Ultra-Stable RoboSiC Proximity Imaging CubeSat Telescope, funded!

CISpec budget and proposal scope

Evaluated all HSGC URI applications

Started DEPSCoR 3 page white paper

7.6.2020 – 7.10.2020

Meetings: Astrobiology with Grieg and Brian, HSGC URI Evaluation Committee, HSFL website, Next Frontiers in Robotic AI and Autonomy (JPL Dr. Ali Agha),

GP algorithm development in spyder. 1D reinforcement learner of convex/nonconvex with noise

CISpec design of activities and budget, review of proposal text and science traceability matrix

More progress on DEPSCoR 3 pager, Brian feedback

7.13.2020 – 7.17.2020

GP algorithm development in spyder. 2D reinforcement learner of convex/nonconvex with noise

CISpec investigation text, transition to spaceflight, cover page, budget details, people

Meetings: HIGP faculty, REU-lite talk, UHM AEP, CISpec proposal, Mars OEPM reporting, Artemis CDR-TRR, Virtual ICML, HIGP all-hands COVID planning

UHM AEP seminar abstract

Addressing NNX comments from Potnis

IEEE aerospace conference paper abstract accepted

LUSTR proposal brainstorming and organization

Proposal organization and methodology to decide whether to pursue a proposal, combed through habitable worlds and PS ECA

7.20.2020 – 7.24.2020

GP algorithm development to 3D and documentation of 1DOF and 2DOF results

Meetings: Ocean Worlds Powell Fagents, LuSTR Li Romo Andersen, CISpec->CHRIS

CHRIS budget, design of activities update to include computer design

LuSTR design of activities, budget, brief search into geotechnical properties, brought on three other experts: Ningjun Jiang, Kevin Cannon, and Honeybee Robotics

DEPSCoR addressed Brian's comments, registered on acupass

Read over Doyle's extraction review and created a tech diagram of PacSat

Submitted NNX manuscript to IEEE TNNLS

7.27.2020 – 7.31.2020

Meetings: LuSTR, HSFL Website, CHRIS tagup, UHM Aerospace, Monthly DEI, Barb, EPSCoR review, N1 Lessons Learned, Kaiaka

Distilled EPSCoR reviewer comments (EPSCoR declined), reviewed with Luke

CHRIS: debrief from Leonard's comments, addressing comments

LuSTR proposal draft 1: goals personnel SWaPD, parsed Shuai's ice DEM geotiff data, incorporating into RL GP, debugging graphics, reformat proposal to Shuai's template

End of StemWorks student internships

8.3.2020 – 8.7.2020

Did not receive NSF CoRoMoana grant

Field trip around Southeast Oahu with Jeff Taylor and Elena Dobrica

LuSTR: technical requirements for Honeybee drill, drafted Notice of Intent, incorporated Phil's text into Proposal Draft 2, relevance, TRL progression

CHRIS: edit timeline/milestones, closed design of activities and budget

8.10.2020 – 8.14.2020

LuSTR: submitted NOI, methodology section, wrote up GP results, gantt chart, finalize personnel

GP: log of algorithm progress, got something to run by normalizing DEM to km, ran multiple circular areas, integrate path distance, predicted and true min comparison, square plot exploration, comparing myopic snake with GP

Keck one-pager accepted for Phase 1 submission

Artemis: closing out the summer plans, education accessibility solicitation, student position renewals

PS White Paper on Robot Technologies for Subsurface Environment Exploration, Draft 2

CHRIS: detailed review of proposal with evaluation rubric

8.17.2020 – 8.21.2020

LuSTR: balancing budget, co-I organization, metrics of success, filling in other management sections, data management, budget narrative

NASA ECF proposal declined

CHRIS: budget, table of personnel and work effort

Literature review on autonomous underwater vehicles, summary

8.23.2020 – 8.28.2020

Meetings: start of weekly ERTH DEI, monthly ex-comm, spoke with potential student David

LuSTR: reformatting, first complete draft done, sent to TIG, revised budget

DoD EPSCoR: started collaboration composition and basic research statement

PS white paper stitching up in submission-ready form

EPET 302: compile spacecraft mission design course topics/syllabus

Submitted Planetary Science Robot Technology White Paper

Artemis: design of activities for fall, stipends/onboarding, scheduling, policy for camps work

Seminars: flyer for ES TGIF, edit slides for UHM AEP seminar with speaker notes

AFOSR Instrumentation and Equipment proposal submitted

8.31.2020 – 9.4.2020

Meetings: recruited Kaiaka to be a grad student!, Artemis kick off, Goodman SBIR kick off, CHRIS proposal, Kala'i, HSFL website meeting, DEPSCoR

LuSTR: responded to proposal team feedback and TIG comments, shortened text, finalized budget, created project summary, first attempt at NSPIRES and mygrants submission, co-I categorization debacle, final submission running through mygrants

Gave UHM AEP seminar series inaugural talk

GAC Bullard fellowship evaluation

9.8.2020 – 9.11.2020

Meetings: T&P personnel committee, Kaiaka kick-off, OER, interplanetary dynamics

Moved hardware and checked out lab

LuSTR proposal submission through both mygrants and NSPIRES

CHRIS proposal submission through both mygrants and NSPIRES

EPET 302 course content, learning objectives, activities

9.14.2020 – 9.18.2020

Meetings: DEI, Kala'i, UHM AEP, NASA SG Artemis Midpoint Review, DiSC training, Keck

EPET 302 Textbook: Chapter 1, Introduction (29 pages)

L2 earth science cooperating faculty appointment

9.21.2020 – 9.25.2020

Meetings: DEI, COSMOS workshop, Kala'i, Kaiaka, PISCES computer, GAC, Keck

EPET 302 Textbook: Chapter 2, Systems Engineering (35 pages), Preface

9.28.2020 – 10.4.2020

Meetings: DEI, Kala'i, Kaiaka, Canendensys, HSGC K-12, Education, aeroconf info, UHM AEP, Keck

EPET 302: Spacecraft Design Drivers (33 pages)

10.5.2020 – 10.9.2020

Meetings: DEI, Kala'i, Kaiaka, Keck, GAC, SGC Fall Director's Meeting

EPET 302: Structures (38 pages), edits for Introduction

10.12.2020 – 10.16.2020

Meetings: DEI, Kala'i, Kaiaka, Keck, NSF AI institute, Danielle, Adria

EPET 302 is now EPET 400: syllabus, Power chapter

Makena Wagner application recommended for admission by ME department

DoD SBIR SOCOM203-002 with Craig for Death Star Navigation System (DSNS)

10.19.2020 – 10.23.2020

Meetings: DEI, Kala'i, Kaiaka, Keck, FRC, i-SAIRIS, NASEM Sexual Harassment, GAC, HSFL Ex-Comm, Jonathan

EPET 302: finished power and structures chapter: Mechanisms, Integrated Power System, Power Management and Distribution, System Analysis

Reviewed Trang and Acosta-Maeda for HIGP FRC Committee

ASC/SG Collaboration Slides

10.24.2020 – 10.30.2020

Meetings: Hualimahi, ASC/SGC collaboration, UHM Aerospace, Kala'i, Baylor/Michael, John Christian seminar, Huliamahi constitution with Paul, Kaiaka, HSFL Ex-Comm, NSF AI Institute

Kaiaka Letter of Recommendation, submitted, reviewed project narrative

Reviewed six conference papers for IEEE Aerospace Conference 2021

EPET 302: feedback annotated in pressbooks until 2.3, CDH chapter – Definition to GPUs (27 pp)

Keck proposal submitted through UH to Keck

11.2.2020 – 11.6.2020

Meetings: Huliamahi, Rover twins, Kala'i, Ladies in CoE, ASC collaboration, OER, Kaiaka, all-gender restrooms

Submitted Kaiaka's NSTRGO to mygrants and NSPIRES

EPET 302: CDH chapter – FPGA to Integrated Computers (46 pp)

Submitted Goodman SBIR statement of work

NSF AI Institute budget and budget justification

11.9.2020 – 11.13.2020

Meetings: Huliamahi, Kaiaka, all-gender restrooms, rover twins, NSF CATALYST

EPET 302: CDH chapter – Data Budget and Profiling to end of Typical Software (39 pp). finished, Beginning ADCS chapter

Bought majority of rover components

Helped assemble HIAPO

Gave a seminar to Singapore Space Challenge over Zoom to 134 participants

11.12.2020

11.16.2020 – 11.21.2020

Meetings: Huliamahi, rover twins, Dave course, AI institute, FRC, Andrew textbook, HSGC URI symposium

EPET 302: ADCS chapter: start to attitude representations (24 pp.)

Annotate pressbooks 2.3 – 4

AI Institute research section and suggestions to education/dissemination

Organize student stipends

Reviewed FRC reports

Bought lab tools for HIG 314A

11.23.2020 – 11.27.2020

Meetings: Huliamahi, rover twins, Jesse Tarnas, FRC debrief, Kala'I, N1 debrief, HSGC Trainees

EPET 302: ADCS chapter: kinematics to common configurations (60 pp.)

NSF AI Institute subaward submitted

11.30.2020 – 12.4.2020

Meetings: Huliamahi, rover twins, all-gender restrooms, Kala'i, Kaiaka
Guided and reviewed HSGC Trainees in application, wrote letters of recommendation
EPET 301 primer lecture
EPET 302à400 ADCS chapter: Determination to end (30 pp.)
Started reviewing Cory Gillete of PDX ADCS paper

12.7.2020 – 12.11.2020

Meetings: Huliamahi, rover twins, Kala'i, Kaiaka, SiGMA grad panel, NSF Catalyst, UHM AEP, SiGMA job panel, ADCS checkout plan, N1 debrief, HyTI Internal Design Review, MSB All-Gender, AEP seminar
CubeSpace ADCS Checkout: Visual, Electrical, and begin Health Check
EPET 400: Thermal chapter: 55 pp.

12.14.2020 – 12.18.2020

Meetings: Huliamahi, rover twins, Kala'i, Kaiaka, Brennon, StemWorks
EPET 400: Finish Thermal chapter: 8 pp., started Communications chapter: 23 pp.
CubeSpace ADCS Health Check
HSGC URI applicant evaluation and selection
Stemworks Challenge February 2021 project description

12.21.2020 – 12.23.2020

Meetings: Huliamahi, rover twins, NSF Catalyst
EPET 400: content for Communications chapter 48 pp., annotated Pressbooks Chapter 3 -5

12.28.2020 – 12.31.2020

EPET 400: content for Communications chapter 6 pp.
NSF GFRP reviewed 14 applicants
NSF Catalyst sections written
500 Women Scientists resume
HSGC Graduate Fellowship Application Draft