May 12, 2022 REPORT | APR 25 – MAY 20
DIRECTOR: TODD SATOGATA

Todd Satogata

Previous two weeks (Apr 25 – May 6)

- EIC Meetings (management, RF, crab cooling, impedance team, R&D, beam-beam)
- EIC BNL Meetings (Ferdinand and L2s, Design/R&D leadership)
- EIC L2 cost/schedule meetings; PSQ@EIC paper update/editing
- EIC Project management training (online, ongoing)
- EIC RCS height/ESR solenoid meeting (May 6)
- MGMT Meetings (Leadership/Dept Heads, CASA coffee, hiring May 6)
- MGMT NSAC open meeting (Apr 28), RPTO Kickoff (May 6)
- MGMT MFURA application reviews, selection meeting (May 4)
- OPS 12 GeV paper writing (for Geoff Krafft)
- ODU Faculty Meeting (May 3)
- ADMIN Training (CST001 May 2)
- SICK (Apr 27)

Next two weeks (May 9 – May 20)

- EIC Meetings (management, RF, crab cooling, impedance team, R&D, beam-beam)
- EIC BNL Meetings (Ferdinand and L2s, Design/R&D leadership)
- EIC L2 cost/schedule meetings
- EIC Project management training (online, completed)
- MGMT Meetings (Leadership/Dept Heads, CASA coffee, SBIR FOA May 18)
- SERVICE APS DPB EOD catalog emails, NAPAC student videos meet (May 17)
- OPS 12 GeV paper writing (for Geoff Krafft), PV paper (Matt Poelker)
- ADMIN Training (SAF103 May 9)
- ADMIN Abstract for ANPA conference invited talk

Alex Bogacz

Previous two weeks (Apr 25 – May 6)

- Preparing a talk on PERLE experimental area design for PERLE Collaboration Workshop
- FFA@CEBAF collaborative work
- Contributing to IPAC'22 papers
- Mentoring Isurumali on isochronous arc optics
- PERLE Management Board work

Next two weeks (May 9 – May 20)

- PRAB paper review
- FFA@CEBAF collaborative work
- ERL'22 and NuFact'22 SPC work
- Invention disclosures review
- Collaborative work with Peter Williams and Rob Epsimon on optimizing filling patterns for PERLE

Ryan Bodenstein

Previous two weeks (Apr 25 – May 6)

- Various OPS related meetings
- FFA@CEBAF collab work
    - Re-designing spreader - based on "Option A" from Chao/Jay
    - IPAC travel and poster preparation

- Positron/FFA liaison work
  - Made slides for Reza
- Student Guidance
  - Isurumali – guidance for arc optics, IPAC paper
  - Alex C –general guidance and mentorship, getting lab laptop
- LDRD work
  - General organizational work
  - Code translation
- CEBAF Center social gathering
- A Moment of Happiness for the Weekly emails

Next two weeks (May 9 – May 20)

- Various OPS related meetings
- FFA@CEBAF collab work
  - Re-designing spreader
  - IPAC travel and poster preparation
  - IPAC paper
- Positron/FFA liaison work
- Student Guidance
  - Isurumali – general guidance
  - Alex C –general guidance and mentorship, getting lab laptop
- LDRD work
  - General organizational work
  - Code translation
  - Preparations for grant renewal
  - "Emergency" slides for Annual Lab presentation sent to Latifa
- Preparing to present to talk at IPAC for Tessa Charles and Alejandro Castilla

Rui Li

Previous two weeks (Apr 25 – May 6)

- Continue developing the matrix transport approach for the TCBI theory, checking the consistency and relation between differential equation approach and the matrix approach, and their relations with the tracking simulation.
- Compare the new analysis with my previous simulation results

Next two weeks (May 9 – May 20)

- Vacation 5/11
- Continue benchmarking the new TCBI analysis with my previous simulation for the one-bunch-in-a-ring case, including cases for TCBI only and for the joint effects of TCBI with the linear beam-beam force
- Got questions from Bhawin Dhital about emittances for magentized beam in the dual-energy storage-ring cooling. Answered his questions and suggested some references
- Served in the interview panel for the Rimmer's SRF group for their SSI hiring.

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Edy Nissen

Previous two weeks (Apr 25 – May 6)

- Attend required OPS/Bteam meetings
- Attend Beam-beam and RCS meetings
- Work on DODGE beam time proposal, will submit by April 30th
- Work on Hall D Raster project for Hall D
- Attend Hall D Beamline working group meeting
- I took half a day off on May 6

Next two weeks (May 9 – May 20)

- Took Monday, May 9 off
- Attend required OPS/Bteam meetings
- Attend Beam-beam and RCS meetings
- Finished Rad worker I training
- Working on IPAC papers
- Will be presenting at SAD summary meeting on the 18th

Chris Tennant

Previous two weeks (Apr 11 – Apr 22)

- AI FOA: coordination meetings (project-wide, field emission, fault prediction) mentoring grad student
- LD2202: plan beam studies work for upcoming run, meeting with UVA
- RADSA2: data cleaning and splitting for training and testing
- Lasitha farewell
- Postdoc meeting with Data Science, Accelerator management
- Vacation

Next two weeks (May 9 – May 20)

- AI FOA: Coordination meetings (project-wide, field emission, fault prediction), mentoring grad student
- LD2202: learning about positive unlabeled learning (PUL), out-of-distribution detection models
- RADSA2: train inverse model, test on beam studies data
- JLab training
- Configuring new GPU-enabled laptop
- 12 GeV CEBAF PRAB edits

Accelerator R & D - Yuhong Zhang

Yuhong Zhang

Previous two weeks (Apr 25 – May 6)

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Next two weeks (May 9 – May 20)

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Kirsten Deitrick

Previous two weeks (Apr 25 – May 6)

- SHC ERL
  - 4-dipole zigzag stretcher with parallel plate dipoles completed
  - Working on 5-dipole zigzag stretcher with parallel plate dipoles (Dave Douglas Tech Note)
  - Microbunching simulation (energy spread scan, tracking down Matlab functionalities
- FFA cell lattice for FFA@CEBAF
  - Track down discrepancies
- Determine longitudinal dilution through FFAs
- Meetings: CASA Coffee, JLab EIC, EIC Weekly, EIC Coffee, Strong Hadron Cooling, EIC Cooler Lattice, BTeam FFA@CEBAF, Ryan's LDRD Biweekly

Next two weeks (May 9 – May 20)

- SHC ERL
  - Working on 5-dipole zigzag stretcher with parallel plate dipoles (Dave Douglas Tech Note)
  - Microbunching simulation
    - Presentation in EIC Accel Design Mtg (5/11) on 150 MeV case; probably gain to worry about
    - High priority to simulate gain through stretcher options for 55 MeV case; probably significant gain to worry about
    - Swap out 2-cell srf cavity in injector for two 1-cell cavities
- FFA cell lattice for FFA@CEBAF
  - Have found discrepancy (different fields seen by the same beam for different modeling approaches); unsure what to do about it
  - Present (05/13) on longitudinal dilution through FFAs, updated emittance dilution budget. Determine longitudinal dilution through FFAs
- Meetings: CASA Coffee, JLab EIC, EIC Accel Design Weekly, EIC Coffee, Strong Hadron Cooling, EIC Cooler Lattice, BTeam, FFA@CEBAF, Ryan's LDRD Biweekly

Bhawin Dhital

Previous two weeks (Apr 25 – May 6)

- I was working on cooling simulation using JSPEC. We found a bug in JSPEC and the bug is fixed. Now cooling performance looks good to cool 275 GeV
- Working on thesis writing
- Working on IPAC22 paper preparation

Next two weeks (May 9 – May 20)

- Will continue thesis writing and cooling simulations in a dual energy storage ring
- Will work on IPAC'22 papers

Amy Sy

Previous two weeks (Apr 25 – May 6)

- Laser particulate counter: Established a preliminary testing plan in LERF lab 2 with the 44 connected channels currently available. The test setup in lab 2 allows for well-controlled, easily repeatable passage of wires and mounted glass slides with dots representing particles. The first set of tests will pass a wire across all working channels at several different velocities and evaluate whether there are characteristics in the signals that are velocity dependent, and whether the velocity information can be extracted from the data. These tests will be repeated at several different locations within the beampipe area.
- Positrons: Submitted LDRD preliminary proposal on using degraded electron beams to assess CEBAF. The objectives of the proposal are to design and install a beamline at the 5D line in the injector that will generate electron beams with enlarged phase space distributions for injection into CEBAF; characterize the acceptance of CEBAF using these degraded electron beams, where the phase space distributions will cover a range from the nominal parameters up to parameters approximating a positron beam distribution; and generating and transporting positron beams through parts of the injector beamline. Continued work on universal spin rotator design - revisiting the analytical formulas to look for solutions over 1-11 GeV.

Next two weeks (May 9 – May 20)

- Laser particulate counter: Troubleshooting optimum system parameters with OSP, since the test setup was reassembled directly onto the optical table in lab 2 to avoid vibration noise from the linear actuator. Teleconference this week to discuss procedures for tweaking system settings after setup modification
- Positrons: Preliminary look at low energy (10-125 MeV) spin rotator field strengths for a positron injector complex based at the LERF- first pass indicates that 125 MeV is likely to be the lowest reasonable working positron energy. Continued work on the high energy spin rotator implementation in the Hall A line.
- Preparing for Director's Review of LBNF/DUNE to be held 5/23 – 5/27

Computational Physics - Yves Roblin

Yves Roblin

Previous two weeks (Apr 25 – May 6)

- Bteam coordination/meetings
- Positron project meetings
- PhD student mentoring on positron project
- Target alignment procedural development for Hall A upcoming He3 exp.
- Panel interviews for positron postdoc
- Abstract writing/talk preparation for NAPAC 2022

Next two weeks (May 9 – May 20)

- Bteam coordination/meetings
- Positron project meetings & PhD student mentoring
- Optics works for CEBAF
- Machine restart
- Panel interviews for positron postdoc
- Abstract writing/talk preparation for NAPAC 2022
- ERR review panel for Hall A E12-21-005

- PAC 50 proposal reviews for TAC meeting
- Reviewing ORFP procedures prior to startup/adjusting as needed

Randi Gamage
Previous two weeks (Apr 25 – May 6)
-
Next two weeks (May 9 – May 20)
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River Huang
Previous two weeks (Apr 25 – May 6)
- EIC Beam-Beam project: For different configurations, testing the dynamic status of HSR (JLEIC) by using Bmad.

Next two weeks (May 9 – May 20)
- EIC Beam-Beam project: For different configurations of JLEIC ion ring, checking emittance growth rates and testing the dynamic status of HSR(JLEIC) by using Bmad.

Isurumali Neththikumara
Previous two weeks (Apr 25 – May 6)
- Continue working of possible beta peak suppression methods.
    - Have to rescale linc lattice, then again retune arcs. This process is time consuming
- Try to figure out a way to translate OptiM decks to elegant.
- Completed Rad worker I related trainings.

Next two weeks (May 9 – May 20)
- Attended "Data Science boot camp" organized by ODU College of Sciences.
- Work on Arc/Linac rescale and complete 10-pass beamline.

Dennis Turner
Previous two weeks (Apr 25 – May 6)
- AI FOA
    - Continued work on the Ops GUI. Explored using ONNX runtime or libtorch for the interface
- Ops
    - Familiarized Mike Merz with the MCC KeyWatcher software so he can take over KeyWatcher management
- FFA LDRD
    - Installed BMAD software and started going through the online tutorial
- PPB
    - Agreed to help with beam measurements for Amy Sy's degraded electrons LDRD
- Completed CST001 Cyber Security Training
- Picked up repaired laptop from the Computer Center
- LCLS-II

    - Work with Yuantao Ding to work out access problems with commissioning documents hosted on SLAC's SharePoint.
- AIPINJ
    - Submitted beam test plans to take advantage of the IHA0I02 harp getting repaired earlier than expected
- My upstairs neighbor's water heater broke and flooded into my condo. My heat pump also stopped working. I had to take some vacation time to deal with all of that.
- Attended 0800, CASA, BTeam, AIPINJ, AI FOA, PPB, FFA LDRD, UITF, LCLS-II commissioning, UITF meetings

Next two weeks (May 9 – May 20)

- AI FOA
    - Worked with Adam Carpenter to get my python environment working correctly again on ACE
    - Wrote abstract for submission for NAPAC. Needs some editing before submission to approval queue
    - Contiued Ops GUI development
    - Continued model development and training
- PPB
    - Figured out basic transport line geometry from S&A floor coordinates
    - Preparing slides for LERF->SL transport line brainstorming ideasCompleted CST001 Cyber Security Training
- HLA
    - Fixed rfCavHistory to work on RHEL6 again and turned the tool over to Michele
    - Look at RF apps to see if any are affected by the recent CED changes
    - Look into turning other RF apps over to someone in HLA or Ops
- Going over LCLS-II documentation for commissioning
- AIPINJ beam studies: Emittance measurments and matching at 0I02 and 0I02 harp/YAG cross calibration
- Attend 0800, CASA, BTeam, AIPINJ beam drivers, UITF optics, AI FOA, PPB, FFA LDRD, SRF Ops, LCLS-II commissioning meetings.

He Zhang

Previous two weeks (Apr 25 – May 6)

- GA code for trip rate & heat load optimization using the new cavity table or the digital twin finished. Runs as expected.
- Read papers on reinforcement learning.
- Note on JSPEC IBS calculation almost finished. Need to add some sample codes.
- Learning to use BMAD and pyTAO

Next two weeks (May 9 – May 20)

- Finish the note on how JSPEC carries out IBS rate calculation.
- Finish the example of pyJSPEC working together with BMAD.
- Read more papers on reinforment learning.
- Continue writing the FMM paper.

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Diagnostic Development - Kevin Jordan

Kevin Jordan
Previous two weeks (Apr 25 – May 6)
- Working a few diagnostic opportunities…

Next two weeks (May 9 – May 20)
- Continue working on diagnostic opportunities
- 5/11 – 5/14 Visited General Ataomics for studies on magic tee combiner & injection phasing studies.

Joe Gubeli
Previous two weeks (Apr 22 – May 6)
- ARDDOT - Work on the LPC & CEBAF diagnostics

Next two weeks (Apr 22 – May 6)
- ARDDOT – Continue working on LPC & CEBAF diagnostics

Michael Tiefenback
Previous two weeks (Apr 25 – May 6)
-

Next two weeks (May 9 – May 20)
-

CASA Fellows

LERF - Steve Benson
Previous two weeks (Apr 25 – May 6)
- Developed statement of work for shieling calculations
- Reviewed medium risk items for Sensitive technology disposition
- Worked on cleaning out office
- Completed and sent in quarterly report for FOA program
- Updated ODH OSPs for User Lab 1
- Rewrote and submitted the LOSP for User Lab 4
- Started JPMQ CAM training
- Worked with Sergei Nagaitsev to nominate J. Jarvis for a USPAS prize
- Hosted Fanglei Lin for a Photon Source working group talk

Next two weeks (May 9 – May 20)
- Provide input for IPAC paper for EIC cooler
- Help to get GEM testing going again in LERF
- Write up FEL prize nomination for Ying Wu
- Finish up JPMQ CAM training
- Prepare talk for Ariel workshop.
- Go over SHC ERL schedule and update if possible
- Update training materials for User Lab 4 users
- Modify training for LERF Safety awareness
- Go over SENS domain files to determine disposition

- Continue to clean out cubicle detritus

Andrew Hutton

Previous two weeks (Apr 25 – May 6)

- VCU: I attended a meeting of the Industrial Advisory Board of the VCU Mechanical and Nuclear Engineering Departments. I always enjoy this, particularly when we get to talk with some of the students. The Department has made a leap forward in the ratings, up to 78th from 124th, overtaking ODU. Their next focus is to increase the grants to the Department, currently at about $3.5M. It should be at least twice that.
- Ghost Collider: I have returned to working on the Ghost Collider with interactions with Kaoru Yokoya. He had concerns, which made me go back and check up on the details. I continue to believe this is a viable proposal - but probably not cost effective.
- PERLE: I contacted Stuart again about the ICRADA; he assured me that he brings it up at every meeting he has with Tim Hallman and expects that it will eventually get signed. Your government at work!
- ALCC: Another meeting and lots of discussion. The latest position of the ALCC is that we support ILC but want to hedge our bets by pushing for Linear Collider R&D funding, particularly for the C3 concept. There are a lot of White papers being prepared for Snowmass, but ERLs does not appear to have any traction in the US.
- Loida: I came up with a great idea to fund Loida to finish up the publication of the Isotope computer program. I proposed to an Isotope start-up that Loida does calculations for their machine (a 70 MeV IBA proton cyclotron in exchange for funding for Loida. I informed Marla of this and she contacted Rhonda Scales for a legal opinion.
- R&D Kick-off meeting: I attended the meeting (I felt I had to, given the Loida connection). I talked to Stuart who thought that the idea of funding Loida by a company was excellent. The meeting itself was somewhat of a disappointment.

Next two weeks (May 9 – May 20)

- Loida: Rhonda told Marla and me that I would not be able to fund Loida as I had proposed, with a series of legal concerns. She suggested paying Loida as a Jefferson Lab employee, paid by royalties from Tech Transfer. Marl, who controls that budget, was amenable so I prepared an SOW and asked Lisa to provide Rhonda Barbosa with the documents she uses for the SULI students. We will see how long that process takes.
- Tech Transfer: I have continued to interact with Marla. I went back to the company and withdrew my offer and received a nice reply that they would be happy to work with Marla to obtain the calculations. I therefore submitted a Copyright Disclosure (somehow different than a patent, but I don't understand the difference yet). I am trying to find out how much we are allowed to publish in a journal without prejudicing the copyright.
- Maggie: I have talked to my summer student; she will start the Tuesday after Memorial Day. I asked her to build a "web wrapper" around SNIPP to provide a simple interface with pull-down menus for the input parameters and to provide a clear output format. Hopefully, she can complete that in the ten weeks. Interestingly, Marla has experience writing web code (UI/UX) and has offered to help mentor Maggie. This will be a necessary addition if we are to market the program.
- ERL Paper: we have received several comments/additions/objections to the paper from the authors who want to update their input. Max Bruker will put in most of them. I pushed back successfully on Georg Hoffstaetter who wanted more visibility and now have to do the same to Valery Telnov who wants everything updated and improved. I have received an OK from JINST who are prepared to accept the paper, obviously subject to the reviewers' evaluation. They want suggestions for reviewers, any ideas would be welcome.

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- AccApp'2023: There was meeting to discuss the possibility of Jefferson Lab hosting AccApp'2023. I am a bit concerned was the person who proposed that we host is Ganapati, and he wants to be the Conference Chairman. He is not the most organized person and I worry that I will get sucked in to fix things. I asked for a written proposal as who does what and Andrei should approve this and provide a charge code. At present, the people whose could involvement was discussed are: Ganapati, Gigi, Anita Seay, Marla, and me; I'm not sure that this is enough. Given that most of the people will be coming from abroad, someone has to be available to help with visa, etc. The proposed location is the Great Wolff Lodge in Yorktown, with a visit to Jefferson Lab for those not from sensitive countries.
- I leave for vacation on May 14, returning May 26, but I will not return to the lab before May 30.