



December 2017 Computing All-Hands Meeting

Agenda

- Welcome to the team
- Lab Status
- Thoughts on the budget
- Staffing
- Computing “events”
- Select Accomplishments
- Q+A

New additions to the Computing team

- Brian Nord, SCD



- Robert Putyra, CCD



WELCOME!!!

We are Jealous....

- Recent or soon to be Retirements...
- Congratulations and thank you for all your contributions
 - John Bernhard, CCD
 - Leo Michelotti, SCD
 - Mike Behnke, CCD
 - Stan Naymola, SCD
 - Julie Trumbo, OCIO
 - Laura Stover, CCD
 - Dave Coder, CCD

Overall lab status

- Executing Well! Very Well
- Projects are all on track! – the most projects in all SC
 - G-2 is in data taking mode and received CD4!!!
 - LBNF to start excavation of far cavern soon
 - SBN buildings completed
 - DES in fourth year of observations.
 - Accelerator performing very well
 - New “PIP1+” plan being executed – it will deliver megawatt+ beams sooner than expected
 - NOvA working very well – early results make “mass hierarchy” potentially within reach
 - CMS and LHC accelerator performing very well, defining our role in the high luminosity upgrades

DC -- New Administration means New Priorities

Areas of emphasis from Secretary

- National Security
- Cyber Security
- Exascale computing (Quantum Information Systems)
- Commercialization of technology
- Science...we need to make our case

Historically – the first year of a new administration is ALWAYS a challenge as they come up to speed and form opinions...

This administration is in particular difficult in that its been slow to staff critical positions

DOE Under Secretary for Science

- ▶ Mr. Paul Dabbar was confirmed as DOE Under Secretary for Science on November 2, 2017



FY18 Budget Reality

- We continue to be in a Continuing Resolution till Dec 8th
- Senate and Congressional mark-ups are quite favorable, especially when compared to the presidential budget request
- A stopgap funding bill was proposed by the chairman of the House Appropriations Committee on Dec. 2 would extend the current continuing resolution by two weeks. (Dec 22)
- Last night, I heard talk that this bill would extend CR over Christmas holidays so as to not “rush an important decision”
- Not clear whether appropriations bills would be passed in this period or whether it would require another CR.
- Little appetite for a gov’t shutdown.
- **HOWEVER**, if a Gov’t shutdown, we have sufficient funds “in the bank” for ~a month

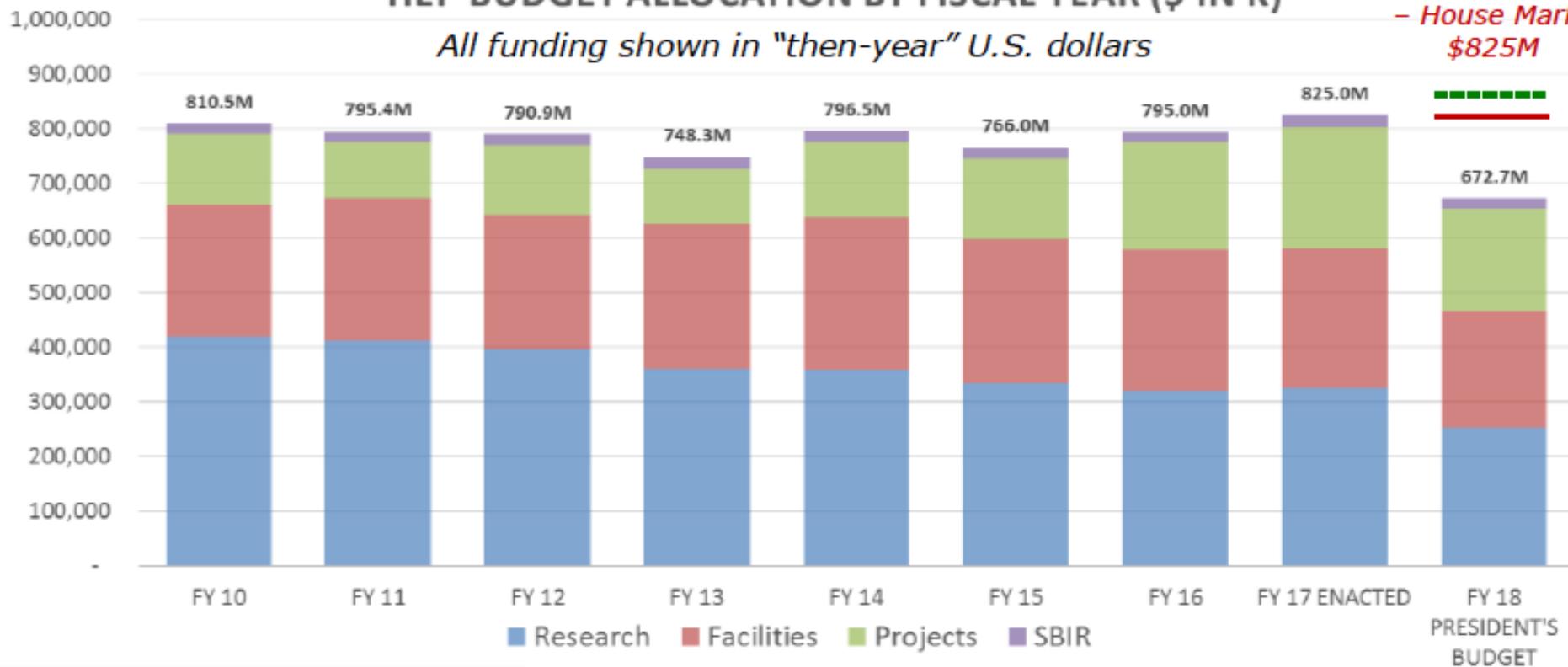
HEP Budget Status

- ▶ Continuing Resolution at the FY 2017 level through December 8
- ▶ Congressional Marks are budget indicators, but final appropriation bill and report language directs program implementation

HEP BUDGET ALLOCATION BY FISCAL YEAR (\$ IN K)

All funding shown in "then-year" U.S. dollars

-- Senate Mark: \$860M
 -- House Mark: \$825M



Fermilab's Top Line Number in FY18

- We expect a small increase from FY17 -- but it is driven by project support.
- LBNF budget must grow to stay on schedule.
- The funds will likely be significantly recolored so we do have a challenging budget to manage...
- Initial Funding plan is reasonable but presents challenges for all divisions in the “Research Budget and Reporting Categories”
 - Detector and Computing budgets were increased WRT FY17 – PGS made the case and OHEP agreed.
 - Taking same approach now with “Research funding”

Lab Optimization Exercise (by OHEP)

- “A systematic analysis of the five largest HEP lab programs has been completed with the goal of positioning the labs for outstanding science for decades to come” J. Siegrist
- This exercise did not provide an answer, but rather pointed to what areas need to be scrutinize more closely.
- Long term, we expect significant redirection of funds and will touch all facets of the HEP program.
- Will take a few years before we know the full impact/scope of these redirections.

Actions Given to All 5 labs

- **Energy Frontier**
 - Ensure no additional charges for CMS and ATLAS Phase I upgrades are being charged to research B&R codes. Since Both have passed CD-3, component R&D for the upgrade projects should be complete.
 - Ensure no additional charges for CMS and ATLAS Phase II upgrades are being charged to research B&R codes after FY 2018.
 - The HL-LHC ATLAS and CMS CD-1 reviews will be charged to look for efficiencies, e.g., by reducing the number of fabrication sites.
- **Theory**
 - Lab management must do a much better job explaining the theory group's integration with lab's program. Lower-performing or misaligned programs (as determined in part by this summer's lab comparative theory review) will see their funding openly competed in future calls for proposals.
- **Computing**
 - An internal OHEP computing WG is examining the HEP computing effort looking for economies of scale. Please assist with data calls when asked.
- **Detector Facilities and R&D**
 - Optimization analysis for detector capabilities {X,Y,Z} indicated relatively low priority and/or projected utilization for these capabilities. Please come prepared to discuss these capabilities at the lab budget briefing with particular attention to how the lab plans to either (1) improve the priority and/or utilization within the HEP portfolio, or (2) provide a long-term view of how these capabilities will impact HEP plans/capabilities.
 - A Basic Research Needs workshop on HEP-oriented long-term Detector R&D is planned; priority Research Directions and the research roadmap identified at this workshop will inform HEP funding priorities for years to come participate!
- **Accelerator Facilities and R&D**
 - Optimization analysis for accelerator capabilities {X,Y,Z} indicated relatively low priority and/or projected utilization for these capabilities. Please come prepared to discuss these capabilities at the lab budget briefing with particular attention to how the lab plans to either (1) improve the priority and/or utilization within the HEP portfolio, or (2) provide a long-term view of how these capabilities will impact HEP plans/capabilities.
 - A Basic Research Needs workshop on security applications of accelerators is planned; Priority Research Directions and the research roadmap identified at this workshop will inform HEP funding priorities for years to come participate!

Fermilab Internal Budget Presentations

- All Divisions had to make budget presentations Thanksgiving week.
- Jon, Panagiotis, and I each prepared and delivered talks.
- We spoke to numbers presented in our Spring FWP numbers
- Actual budget will be different – how different remains to be seen.
- Some General Themes
 - Very little “free energy” in the system
 - Funding is not well matched to the scientific program we are executing – field wise

Overall Staffing Situation

- In FY17, we had 18 employee's leave for a variety of reasons
- Due to hiring slowdowns and budgetary realities, we have only hired back 12 thus far, and not necessarily replacing skills 1 for 1.
- Of those 12, 6 are diverse! Well done!

- Lab is starting to emerge from its hiring freeze – a slow “thaw” if you will
- All divisions have a back log of hires that they would like to make
- Jobs committee beginning to prioritize that list.

Fermilab Open House - Sept. 23



Computing Picnic Kuhn Barn - Sept. 28



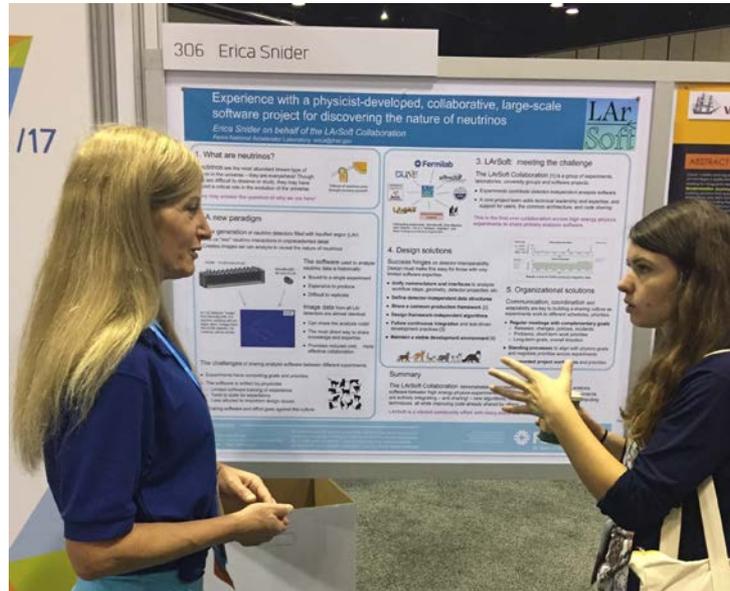
Thanks Rachel for organizing this!



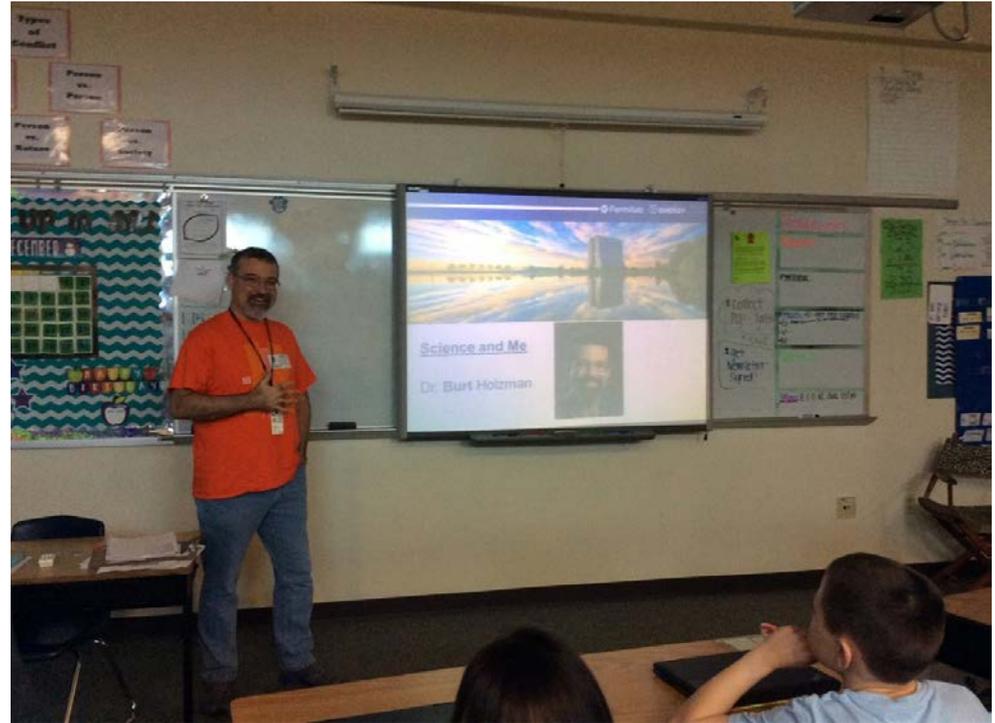
I learned that Computing people and veggies don't mix



Grace Hopper Celebration - Oct. 4 – Oct. 6 Orlando, Fla



Hour of Code – outreach!

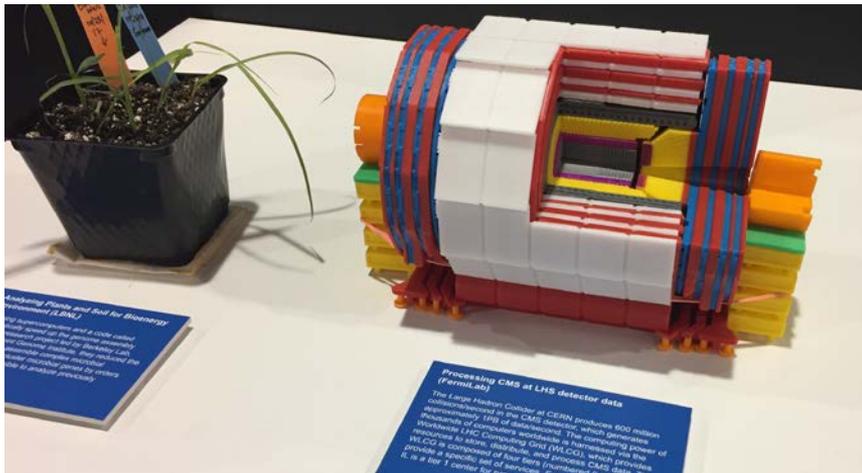


Burt Holzman, visited Wolf's Crossing Elementary School in Aurora today.

[@sd308](#) [#STEM](#)

16 computing folk participated! Thank you!!!

SuperComputing Nov. 12 – 17 Denver, Colorado



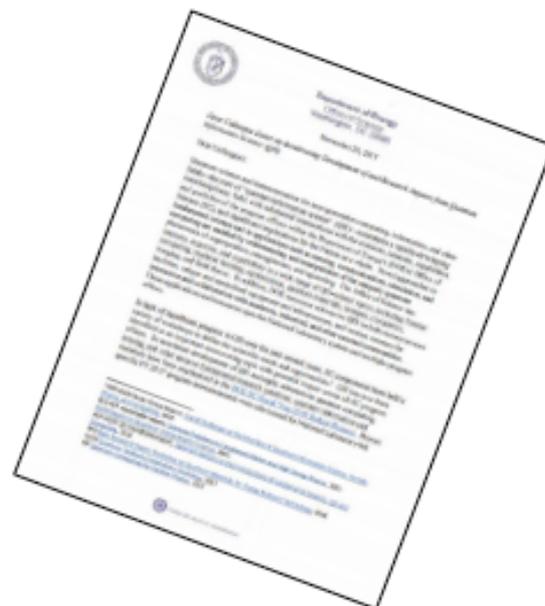
SuperComputing Nov. 12 – 17 Denver, Colorado

Burt delivered two Talks at Google and AWS

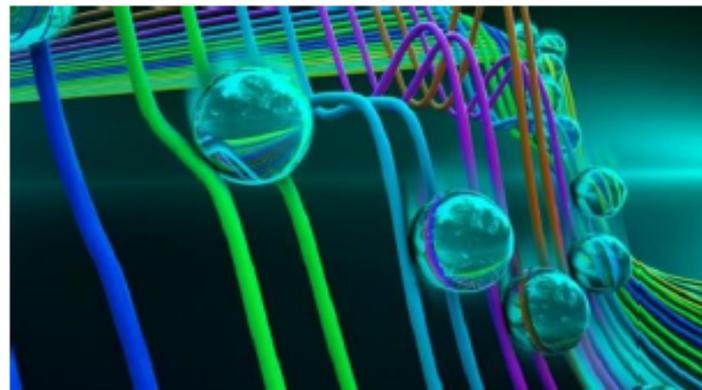
- HEPCloud
- utilization of specialized hardware for Machine Learning applications (potentially to be provisioned by HEPCloud), but the emphasis was on hardware.
- Many interactions with vendors, most notable those with IBM, since we expect them to be major players in our storage tech change, also on quantum and cloud services especially for specialized hardware for Machine Learning.
- Fermilab also contributed the smartest and best looking division head attending the conference :)

SC Dear Colleague Letter on QIS

- ▶ Office of Science (SC) Dear Colleague Letter was released Nov. 29, 2017
- ▶ Quantum Information Science (QIS) identified as an important cross-cutting topic with potential impact across all SC program offices
- ▶ Should be taken as a statement of interest in encouraging activity in this field
- ▶ Encourages submission of innovative research ideas in QIS via any appropriate existing mechanism
- ▶ The DCL is not a solicitation and does not add to the scope of, or change the review criteria of, any published announcement



For full text, see "What's New" at:
<https://science.energy.gov/sc-2>



Quantum Computing Initiatives

- Quantum Computing an important new initiative in SC (Steve Binkley)
- Success requires scientists from many different disciplines – ASCR can't do this alone.
- Fermilab has 5 different thrusts, the two that align with our skills/interest include
- HEP applications of near-term quantum computers
 - Google and IBM will make ~50 qubit quantum computer available for us to run on next year
- Quantum networks
 - We have agreed to host a quantum network on site in collaboration with Caltech and AT&T
 - Many opportunities to form partnerships with AT&T. (PGS did amazing when the #3 person in AT&T visited)

Building Alliances for Quantum Computing

In line with our competencies, we are pursuing R+D thrusts in quantum networking, quantum algorithms, quantum sensors and quantum technologies



Google (left) is interested in leveraging HEPCloud with their quantum offerings

Lockheed Martin (right) is exploring ways to partner with Fermilab in quantum!



SCD: Fermilab PIs are awarded ~\$3.5 million/year through the DOE SciDAC program

We are lead institution on 3 out of the 4 projects awarded by OHEP:

- **Accelerator Science and Simulation 4 (ComPASS-4)** (PI: Jim Amundson) (Partnering institutions: LBNL, UCLA and ANL)
- **HEP Event Reconstruction with Cutting Edge Computing Architectures** (PI: Giuseppe Cerati): (Partnering institution: U Oregon)
- **HEP Data Analytics on HPC** (PI: Jim Kowalkowski) (Partnering institutions: ANL, LBNL, U. Cincinnati, Colorado State)

Also a participant in a fourth project led by SLAC

- **Monte Carlo Simulation of High Energy Events** (Lead PI: Stefan Hoeche, SLAC; PI Stefan Prestel, FNAL PPD)

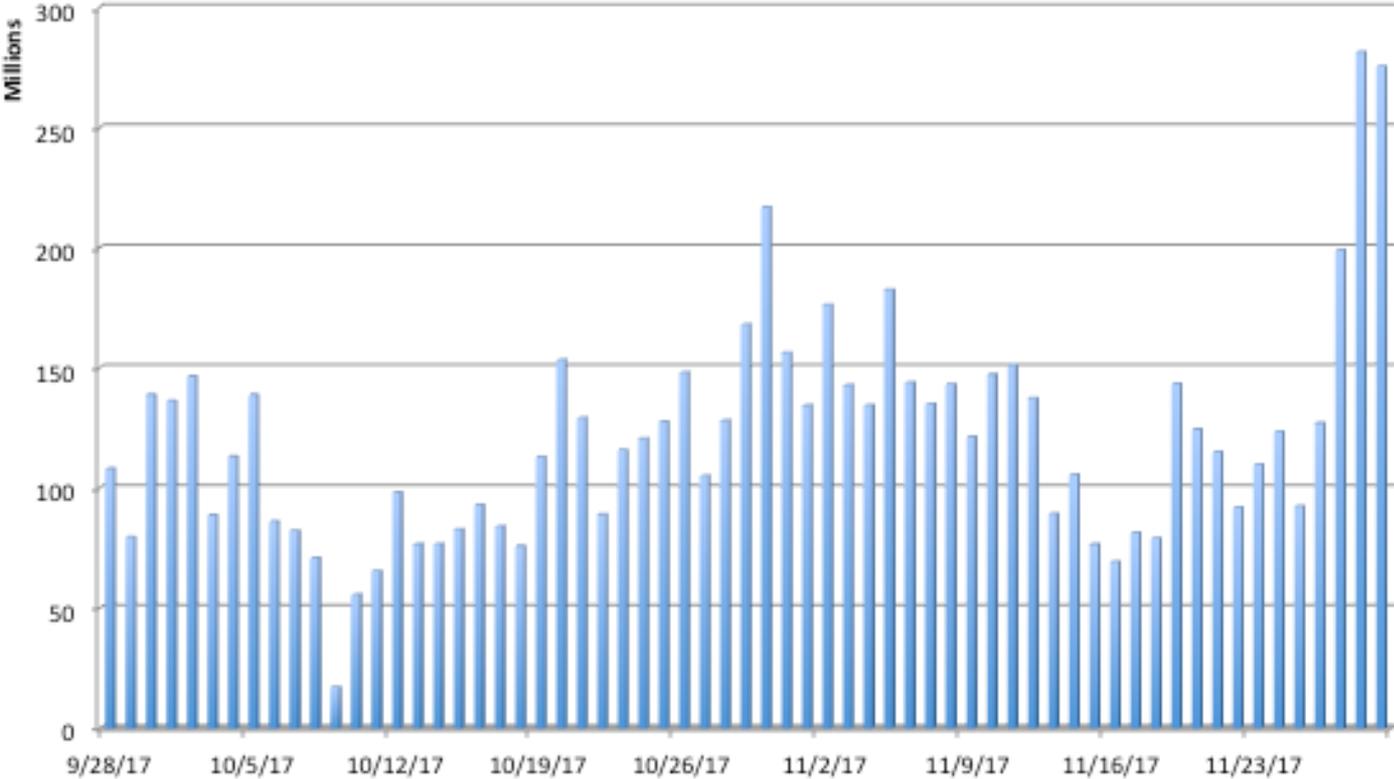
Funding is for 3 years minimum, but we may receive funding for some of these projects for up to 5 years.



Cybersecurity: Protecting our Digital Assets

Scan volume to Unallocated Subnets

Scan Volume to Unallocated Subnets (Sep 28 to Nov 29)



More Cyber News

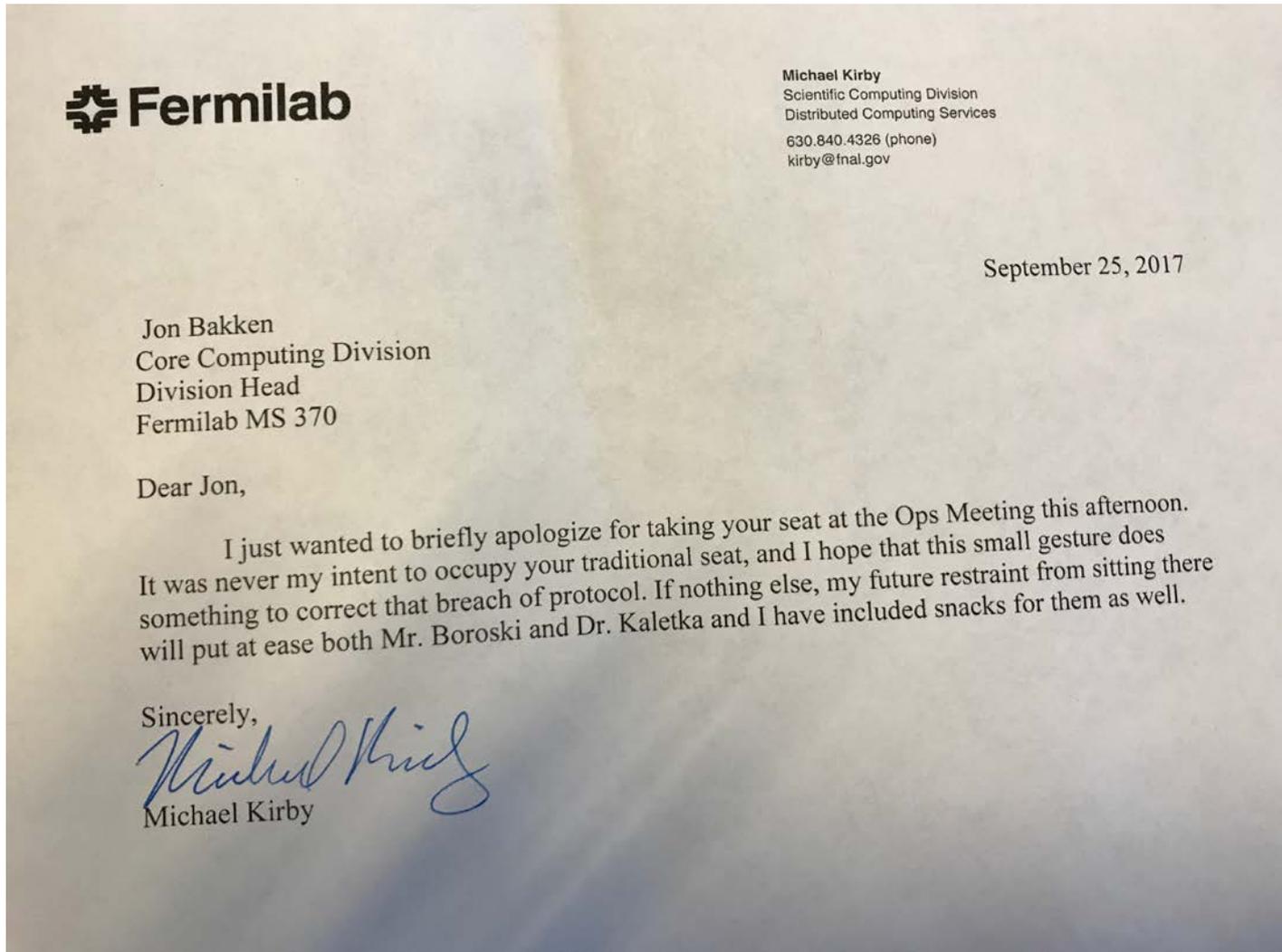
- Site Firewall Status
 - Firewall implementation continuing to move forward – 11 subnet, FCC wired, and wireless behind firewall so far
 - Threat protection will be enabled on Dec 11th for monitoring, then blocking on Jan 8th.
- Phishing
 - Campaigns continue and will soon implement “proofpoint”
- CYBER Management Advisory Team being “stood up”
 - First meeting next week
 - Will use for decisions beyond CIO “pay grade”
 - Use as a vehicle to remind people that Cyber is NOT just Irwin’s problem...

“Me Too”

Let this be a lesson.....



Lesson Learned... 😊



Welcome our new SSO

- John Ylinen (ylinenj@fnal.gov)
- Our New Senior Safety Officer!



- Thanks to Amy Pavnica!!!
 - She is still part of ESH and Fermilab but will have other responsibilities going forward.



ISO 20000 Service Management Audit

- Annually we are audited by an external organization to ensure we are doing what we say we are doing.
- This year we completed a very successful audit with only three opportunities for improvement.
- We met our goal to have the audit be a “No Op” event.
 - Service providers did not have to do any additional work beyond running their services in order to prepare for the audit.
- All of you are doing an excellent job of running your services. Please keep following the processes moving the bar forward!!!

Results of Services Culture

- Scientific Computing is Core Competency of the lab
- Scientific Computing continues to be acknowledged for excellence in Computing and has received several inductions of money to help the physics community
 - HEP Cloud
 - Data Archival Facility
 - Quantum Computing
 - Machine Learning
- Core Computing Division provides a stable and advanced infrastructure for the lab is proactive in meeting the computing needs of the laboratory
- Consistent and better Communication with our colleagues

Enterprise Architecture - Where are we?

- Enterprise Architecture is continuing and is coordinated on my behalf by:
 - Krysia Jacobs – Senior Enterprise & Data Architect
 - Tammy Whited – Head, Service Management
- Community Collaboration Discussion Meeting is held every other Thursday at 10AM in FCC1W
 - All are welcome to attend, per managers approval
 - Presenters discuss their plans for new projects, proposals for changes to architecture and services
 - Interactive forum to share information with Computing and provide awareness of all the excellent things we are doing to move the laboratory forward on its mission
 - Contact Carla to receive an invitation to the meeting
 - [CCDM](#) Agenda on FermiPoint
 - Contact Krysia and Tammy to get on the agenda

Usability Improvements in Service Now

- We are creating a new Service Desk web portal to better fit the needs of our end users.
 - The casual user finds our interface difficult to navigate
- The new portal will make it easier for customers to find what they need and will be mobile device friendly.
- It will more closely resemble what you see when ordering items online on other sites.
- Expect spring delivery!

Some Selected Recent Accomplishments in CCD

- Payroll Upgrade
 - Recall, decided to upgrade Peoplesoft rather than embark on a new payroll system
 - Successful completion of Payroll upgrade project – 1 week of planned schedule, on budget.
 - Enormous effort by Edith and her team, Rosier/Mitch/Sripdada and their team, Uday and his team, and Finance Payroll team.
 - Well documented help guide! I was able to make changes!
 - Payroll “advices” electronic only beginning in January!
- Kronos
 - Had to upgrade to new version
 - Completed on time and on schedule!
 - Excellent Communications plan and training

Some Selected Recent Accomplishments in CCD

- VoIP
 - Ray and his team have developed plan to migrate us off 5ESS. Requires lab funding to proceed.
 - FCC3 being converted to VoIP in December, and FCC1+2 in January.
- Zoom rooms
 - AV standard – If you have not seen one, come to FCC117 and test it.
- Archives
 - Valerie's display cabinet on 15th floor – to prominently display our historical artifacts.

Nigel's Upcoming All-Hands Meeting

- He picked a date AFTER I scheduled this one – so I elected to keep our date rather than move it to January.
- I am not sure what he will cover.
- Expect him to concentrate on numerous accomplishments and some new additions to the team.
- Don't expect any additional clarity on budgets from what I said – but maybe DC will surprise us with some decisions
- If he says something that Jon, Panagiotis and I feel warrants comment/clarification, we will find the right vehicle/venue to do that.

**Happy
Holidays!!!**

Questions



Exascale Computing

- Exascale computing capability will be a game changer for science
 - Just 5 percent of capacity of an exascale machine is 50 times what HEP has available today worldwide!
- We are on a path to ensure we are ready when exascale machines are "on the floor" in the mid-2020's
 - Evolving code to leverage full power of these machines
 - Incorporating new techniques that fully exploit these compute capabilities (machine learning)
 - Developing computational physics algorithms (for accelerator, cosmology, lattice QCD)

Exascale Computing

- Moving toward exascale, we need to learn how to live in a heterogeneous environment (HPC, grid, cloud -> HEPCloud)
 - HEPCloud will be the portal to this ecosystem
- Fermilab is planning to purchase and include its own HPC resources as part of our overall computing model
 - Coordinating with ANL to align HPC technologies
- This plan aligns Fermilab's compute technology with ANL's, making it easier to leverage ANL computing for peak loads to do our science
- Staying current in computing infrastructure is so critical to our mission that we are redirecting \$1M to SCD this year