

USQCD Facility Review 2013

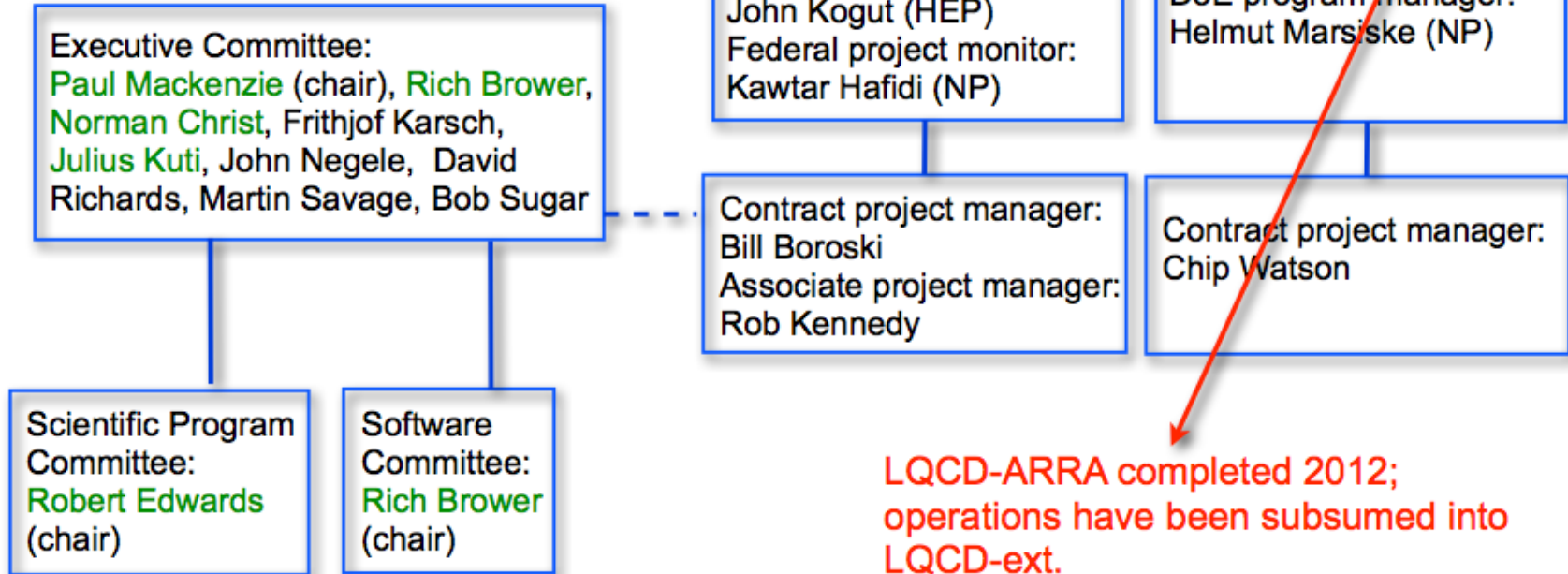
USQCD Allocation Process

Robert Edwards

USQCD Collaboration

LQCD-ext Project

LQCD-ARRA Project



USQCD members present today.

The USQCD collaboration is funded through SciDAC, through the LQCD project, and through base HEP and NP funds at BNL, Fermilab, and JLab.

USQCD collaboration web page: <http://www.usqcd.org>

LQCD-ARRA completed 2012; operations have been subsumed into LQCD-ext.

These two projects being reviewed today were managed cooperatively and operated as a coherent whole.

Functions of the Executive Committee

- Write major proposals for the collaboration
 - SciDAC [now split into HEP and NP]
 - USQCD Facilities proposal
 - Requesting time on Leadership resources:
 - DOE/INCITE
 - NSF/Blue-Waters
- Broadly outline the scientific goals of the collaboration

Scientific Program Committee

The Scientific Program Committee (SPC) advises the Executive Committee (EC)

- The SPC advises the EC on science priorities for USQCD
- The SPC recommends projects for leadership resources
- The SPC suggests to the EC allocations of computer time on the USQCD facilities (FNAL+JLab+BNL) as well as leadership resources

Membership

- SPC: currently, 7 members
 - Serve about 3 to 4 years
 - Rotate about 1 or 2 each year
- 2013: S. Catterall, W. Detmold, [R. Edwards](#), T. Izubuchi, P. Petreczky, D. Toussaint, R. Van de Water
- 2012: S. Catterall, [R. Edwards](#), T. Izubuchi, P. Petreczky, M. Savage, D. Toussaint, R. Van de Water
- 2011: S. Catterall, R. Edwards, T. Izubuchi, [F. Karsch](#), M. Savage, J. Shigemitsu, D. Toussaint
- 2010: T. Blum , S. Catterall, C. Dawson, R. Edwards, [F. Karsch](#), M. Savage, J. Shigemitsu
- 2009: T. Blum , C. Dawson, R. Edwards, A. Kronfeld, [F. Karsch](#), M. Savage, J. Shigemitsu
- Previous chairs: [Andreas Kronfeld](#), [Claudio Rebbi](#)
- USQCD:
 - Total of 20 people have served on the SPC
 - Total of 29 people have served on the SPC and/or EC
 - Total of 163 members in USQCD

Allocation process

- Process driven by the scientific goals of USQCD
- The SPC determines the available resources for the upcoming year
- The SPC defines the guidelines for the proposal Types [A,B,C]
- After approval from the EC, the SPC issues the Call-for-Proposals
- The SPC collects and reviews the proposals. Further information is often requested from the proposers.
- After deliberation, the SPC arrives at an allocation through an internal vote
- Recommendations for allocation are submitted to the EC for approval. The facility managers are also consulted
- The SPC notifies the PI-s
- Will address these steps in more detail later

Allocation process, cont.

- Process driven by the scientific goals of USQCD
- Members of the collaboration submit proposals to the SPC requesting resources for scientific computations
- The SPC has not issued calls soliciting specific computations targeting specific goals of USQCD – not perceived as required at this stage
- Rather, the SPC evaluates the proposals and recommends allocations based on the proposal's technical and scientific merit, and the relevance and importance to meet the scientific goals of the USQCD collaboration as defined in the Call-For-Proposals

All-Hands Meeting

Important SPC function is organizing the annual All-Hands Meeting of USQCD

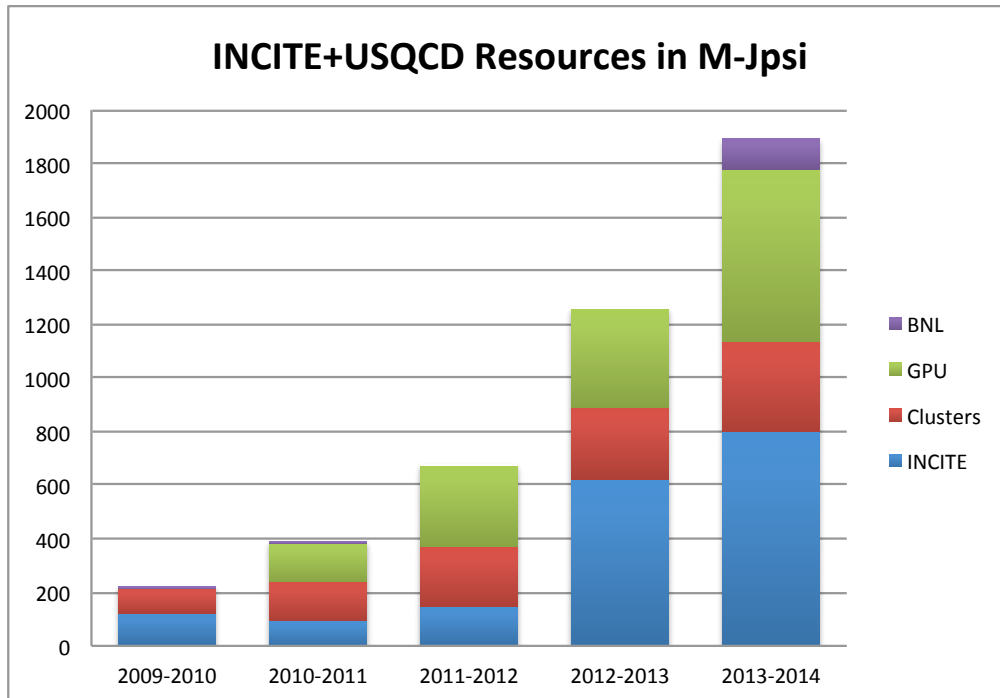
- Gather reports from the Project manager, EC, and the Facility managers
- Historically, all the PI-s for Type A and B proposals made presentations
- In last two years the SPC has changed the focus of the meeting to determining the goals of the collaboration. Only a few PI-s are invited to give presentations.

Diverse architectures

- Several architectures have been added over time:
 - Myrinet and IB clusters
 - Grid based Gigabit-ethernet clusters
 - QCDOC
 - Crays and now Crays+GPUs
 - Bluegene/P (and Q)
- Some commonality in comms fabrics. Some similarity in FPU's. Somewhat balanced compute & comms
- GPUs have been disruptive game changers [sorry for the pun]
- New architectures make ascertaining delivered “flops”, and hence science output, a challenge. Allocation process a constrained system

Available resources

- Different machines & capabilities
- Attempt to normalize. Historically, use average performance from different inverters
- Tape and disk requirements have grown considerably. Now grows at 8% facility budget, formerly below 5%.



1 Jpsi = 1.2 GF

Significant boost recently from INCITE
Large fraction of resources from GPUS

> 1 PF sustained for QCD

Proposal classifications

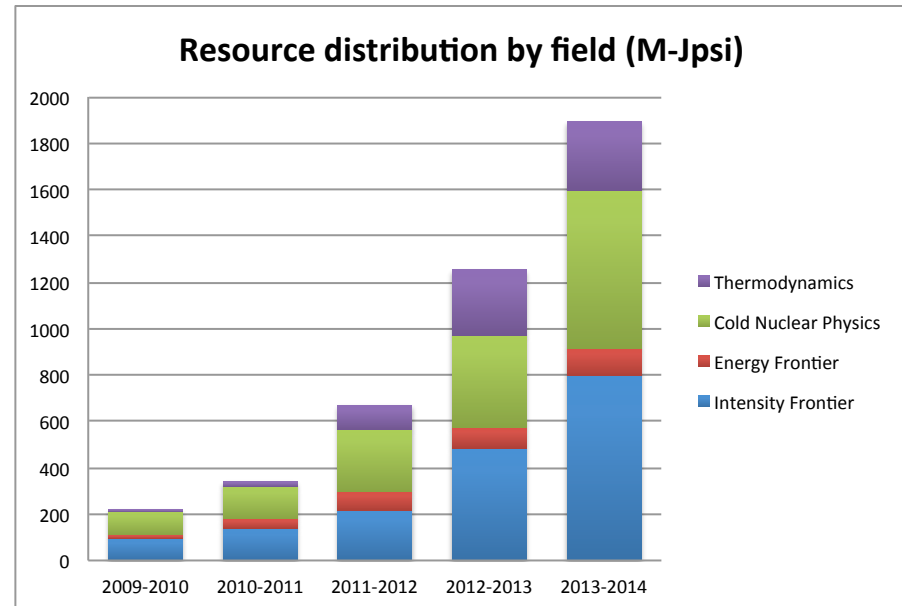
- Types of proposals:
 - A: [$> 2.5M$] benefit to all of USQCD and/or addressing critical needs of USQCD
 - B: [$< 2.5M$] support calculations in early stage which will (potentially) address needs of USQCD
 - C: [100K] exploratory calculations and/or benchmarking
- Comments:
 - Type C can be requested from Facility managers at any time
 - Students/postdocs encouraged to submit Type B proposals
 - Type A proposals often justified by producing gauge fields or propagators
 - No fixed definition of Co-PI-s.
- Want vibrant Type B proposal mix – encourage development
 - A target has been 10 – 15% allocation in type-B
 - Current year: removed Type B from annual process. Now 6 months in duration, and can be requested any time of year from SPC and deployed quickly

Proposals

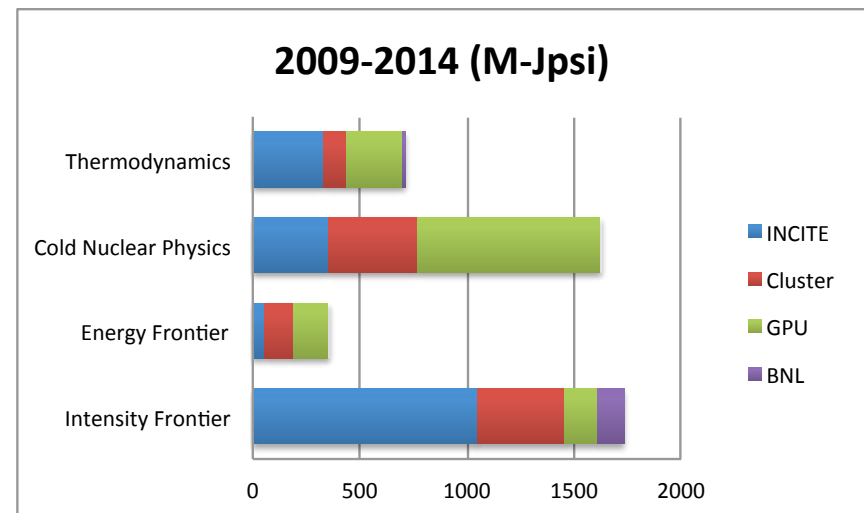
- Counts:
 - 2009: 19 type-A; 9 type-B proposals
 - 2010: 22 type-A; 12 type-B proposals
 - 2011: 22 type-A; 15 type-B proposals
 - 2012: 24 type-A; 11 type-B proposals
 - 2013: 27 type-A; currently 2 type-B (switching to new system)
- Trends:
 - Resources typically 1.3x to 1.7x oversubscribed
 - Many type-B projects have matured and graduated to type-A [good]
 - Several type-B projects have merged into type-A
 - Presently, type-B amount to 6% of allocated hours
 - To encourage more type-B proposals, have switched to new system [available year-round]
- Comment:
 - Most proposals use SciDAC codes at the base. Many proposals adding higher level functionality needed for that project
- Science evolution:
 - Projects introduced over-time have been incorporated within USQCD strategic goals. E.g., spectroscopy, nuclear structure, g-2 & hadron vacuum polarization, energy frontier program, charge fluctuations

Resource distribution by field

- Similar resource distribution for HEP and NP projects
- Thermo has climbed in %
- Energy frontier retooling



- HEP: large fraction from INCITE
- NP: large fraction from GPUs



Future

- SPC feedback to facilities:
 - Growing need to understand effectiveness of resources for delivering science
 - Demand (over-subscription) for resources are guiding purchases
- Science evolution:
 - Proposal driven process has allowed for projects to drive USQCD in new science directions
 - Proposal process adapting: encouraging new projects
- Collaboration Meetings:
 - Have evolved from allocation discussions to critical & constructive assessments of USQCD's scientific goals & priorities