

CoDaS-HEP Welcome and Overview

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CoDaS-HEP Goals

Software is a critical ingredient to our scientific research. Learning the latest tools and techniques is essential to advancing our science and is a fundamental part of the training of young researchers.

This is the first school on tools, techniques and methods for Computational and Data Science for High Energy Physics (CoDaS-HEP). Our goals are:

- to provide a broad introduction to critical and useful skills in Computational and Data Science
- to provide examples of applications in HEP
- to foster a broader community of HEP people interested in these topics

Big Picture Overview of the Agenda

- **Monday:** Challenges, Git, Floating Point, Parallel Random Number Generators and Functional Programming
- **Tuesday:** Parallel Programming and Machine Learning Technology, Seminar on Machine Learning for Neutrino Physics
- **Wednesday:** Parallel Programming and Machine Learning Methods, Seminar on Parallel Charged Particle Tracking Reconstruction
- **Thursday:** Vectorization, Performance Optimization and Language Interoperability, Closeout

Breaks, Lunches, Evenings

- Breakfast will be served here every day
- Coffee breaks and lunches will be served here
- **Monday evening:** a light reception in the Lewis Library Atrium
- **Tuesday evening:** a “social mixer” event (with food and drinks) at the Nassau Club, together with people attending a small CMS Software/Computing meeting.
- **Wednesday evening:** you are free for dinner
- **Thursday evening:** Dinner at Trattoria Procaccini

Addresses are all in the Indico agenda!

Logistics and Organizational Issues


Practicalities

- Dorms
- Power (under your table)
- WiFi (eduroam, PUVisitor)

Travel Reimbursement

- Guidelines: <http://codas-hep.org/pages/reimbursement.html>
- Don't worry about it now, unless something special has come up. We can come back to it on Thursday at the end of the school.
- We should have a form available in the next couple of days
- We would like to receive reimbursement requests by 1 week after the school (Friday, 21 July, 2017).

Please fill in your "introduction" slide today


 **Ian Coeden**

My expertise in:
HPC code and workflow and performance tuning
Parallel Programming

A problem I'm grappling with:
How to implement a new HPC workflow Software Engineers (SE) that can contribute to solving major scientific research in a meaningful and impactful way.

I've got my eyes on:
Learning successful code-declarative software development

I want to know more about:
How to design and implement a workflow that will address the needs of SEs in the current and future research community.



 **Peter Elmer**

My expertise in:
HPC Energy Physics (HPP) software and computing, high performance computing practice

A problem I'm grappling with:
Managing the interplay effects of our existing code and applications and finding ways to create a new Energy and Sustainable long term strategies to address our challenges.

I've got my eyes on:
HPP challenges in the US.

I want to know more about:
Places where HPP problems arising with the larger research community, ideas and case studies to help us learn from each other and address our needs for an excellent practice and research environment.

My research:
On-line Experiment in US. I work on building the US HPP community, and on building the US HPP software and infrastructure with focus on the scientific practice and research environment.

 **Slava Krut'evoy**

My expertise in:
HPC but not so well as the others, but for consistency we mentioned the heading below.

A problem I'm grappling with:
HPC but not so well as the others, but for consistency we mentioned the heading below.

I've got my eyes on:
HPC but not so well as the others, but for consistency we mentioned the heading below.

I want to know more about:
HPC but not so well as the others, but for consistency we mentioned the heading below.

 **Matthieu Lefebvre**


My expertise in:
Software development and optimization.

A problem I'm grappling with:
Finding better understanding of the science problem.

I've got my eyes on:
Work on GPU computing, Workflow management, etc.

I want to know more about:
HPC challenges and software solutions.



 **Steve Lantz**



My expertise in:
HPC Code optimization, parallel programming

A problem I'm grappling with:
How to help scientific codes perform well without losing sight of the science. How to get experienced users to work with code quality and performance (code review, benchmarking)

I've got my eyes on:
Python and Julia

I want to know more about:
Python, Java though I speak nearly all of my first language (being english - lol) lol

My research:
Performance research on server systems, high performance computing

 **David Luet**

My expertise in:
Multi-scale and development techniques
Customized Integration/Control, Testing, System Code Management, Collaborative Software Development, Agile Software Development.

A problem I'm grappling with:
Customizing Reservoirs to change the way they strongly affect the world.

I've got my eyes on:
How the world of Reservoirs with the world of controlled language. I need that's the promise.

I want to know more about:
Artificial Intelligence and Machine Learning especially in their applications to science and engineering.



 **Tim Mattson**

My expertise in:
Performance design patterns of parallel programming to help create the right course programming solutions (e.g. OpenMP and OpenCL).

Oh, and teaching:
I am an educational innovator, teaching youth and adults alike for the USACE.

A problem I'm grappling with:
Use educational technology resources, OER, and bring open materials and help them secure access in the language of their choice.

I've got my eyes on:
Software resources to help and/or communicate with their own domain specific languages.

I want to know more about:
Physics in my domain. Computer Science is being - it just is a hard to be an educational physics.

 **Jim Pivarski**

My expertise in:
Physics inspired, Big Data ecosystem, parallelization techniques, engineering language design


A problem I'm grappling with:
Developing an engineering user's language ecosystem for HPC.

I've got my eyes on:
How to get people to work, depending on the way they do their work, depending on the way they do their work, depending on the way they do their work.

I want to know more about:
HPC performance issues.

My research:
Software tools for multi-user systems
Software resources for HPC software and Big Data
Data-Driven Learning software from industry




 **Dan Riley**

My expertise in:
C++, Assembly, remote communication protocols

A problem I'm grappling with:
Managing the interplay effects of our existing code and applications and finding ways to create a new Energy and Sustainable long term strategies to address our challenges.

I've got my eyes on:
How to get people to work, depending on the way they do their work, depending on the way they do their work.

I want to know more about:
Machine learning

Summary

- If you have questions during the lectures, please do not hesitate to ask
- If you have other organizational questions, let us know
- Take an opportunity to get to know people working on other experiments
- Hopefully the school will be an interesting and educational experience!