



# Welcome to the *Pittsburgh Supercomputing Center* MPI Programming Workshop

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# Who are we?



- If you find this a useful resource, you are welcome to apply for time to continue as a member of our research community.
- It is free.
- It is easy.

# Who am I?

# John Urbanic



*Distinguished Service Professor  
Carnegie Mellon University*

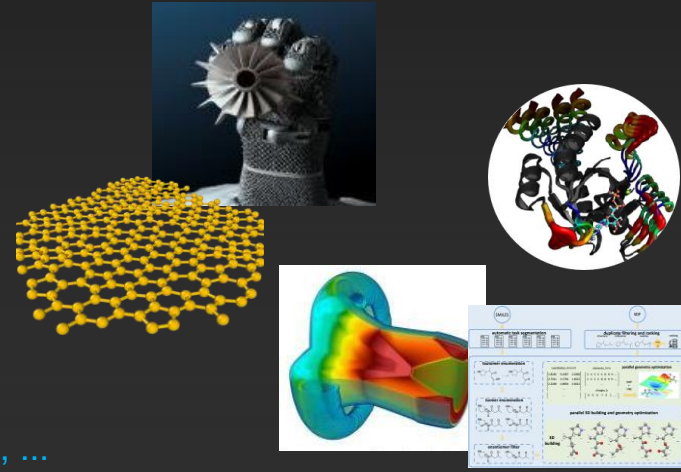


*Undergrad Advanced Computational Physics  
Graduate Large Scale Computing  
Data Science Capstone Projects*



*Parallel Computing Scientist  
Pittsburgh Supercomputing Center*

*Code, code, code, on  
Parallel platforms: MPI, OpenMP, OpenACC, ...  
Big Data platforms: Spark, ...  
Machine Learning: Spark, TensorFlow, PyTorch, ...*



# PSC HPC Monthly Workshop Schedule

- October 15-16 *HPC Monthly Workshop: Big Data & Machine Learning*
- November 13 *HPC Monthly Workshop: GPU*
- **December 10-11** ***HPC Monthly Workshop: MPI***
- January 7-8 *HPC Monthly Workshop: Big Data & Machine Learning*
- February 19 *HPC Monthly Workshop: OpenMP*
- March 4-5 *HPC Monthly Workshop: MPI*
- April 9 *HPC Monthly Workshop: GPU*
- May 13-14 *HPC Monthly Workshop: Big Data & Machine Learning*
  
- More to come!

# HPC Monthly Workshop Philosophy

- Workshops as long as they should be.
- You have real lives...
  - in different time zones...
  - that don't come to a halt.
- Learning is a social process
  - This is not a MOOC
  - This is the **Wide Area Classroom**  
so raise your expectations!

# Agenda

Tuesday, December 10<sup>th</sup>

- 11:00 Welcome
- 11:15 Computing Environment
- 12:00 Intro To Parallel Computing
- 1:00 Lunch Break
- 2:00 Introduction To MPI
- 3:30 Intro Exercises
- 4:10 Intro Exercises Review
- 4:30 Scalable Programming: Laplace Exercise
- 5:00 Adjourn / Laplace Exercises

Wednesday, December 11<sup>th</sup>

- 11:00 Advanced MPI
- 1:00 Lunch break
- 2:00 Laplace Review
- 2:30 Outro To Parallel Computing
- 3:15 Parallel Debugging and Profiling Tools
- 3:30 Exercises
- 4:30 Adjourn

# Resources

Your local TAs

Questions from the audience

On-line talks

Copying code from PDFs is very error prone. Subtle things like substituting “-” for “-” are maddening. I have provided online copies of the codes in a directory that we shall shortly visit. I strongly suggest you copy from there if you are in a cut/paste mood.

## The old XSEDE YouTube Channel

These are the last WAC versions of these events and have much of this content. Find them on the XSEDE Monthly Workshop Training Channel:

### *XSEDETraining*

They will be incrementally appearing in the coming months on a new channel. Subscribe and give us feedback.