

CS599: High Performance Computing

Presentation

Paper Selection Due: see BBLearn

1 Introduction

You will give a 20 minute presentation (roughly 20 for the talk + 5 for questions). These papers typically require careful reading. So you should not expect to read a paper in 1/2 hour, make up your slides, and be done. You may actually pick a paper right now, read it, and re-read it throughout the semester as we may uncover some of the relevant concepts.

The papers in the conferences range on the spectrum from applied/engineering papers to more theoretical papers. There are plenty of theoretical papers, but they can be difficult to understand and to present. If you think of yourself as an “algorithm person”, then these more theoretical papers may be of interest to you.

I am aware that you are not (yet) HPC researchers, so it’s expected that understanding part of these papers will require some background that you may not have. But that’s part of the exercise. Can you figure out what’s interesting in the paper in spite of not being an HPC researcher? Can you find/read other material that helps you understand the paper? You should always feel free to talk to me about the paper before your presentation so that I may be able to clarify content that has you stumped.

The goal is for all of us to learn together through these presentations and hopefully have interesting in-class discussions/questions. The goal is to cover important HPC topics via paper presentations instead of lengthy lectures. As a result, I may interject during presentations to give further explanations or to relate paper content to course material. I may also give feedback/advice on presentation style to help your future presentations.

The presentation should outline the general objective of the paper, the research results, and open up questions for the class. These questions could be research questions, but also more down-to-earth questions having to do with fundamental principles, existing technology, or experimental methodology, or even “what does this mean?” questions.

DISCLAIMER: Two approaches are typically considered for presenting papers. The first consists in picking classic papers, or papers on topics that I am very familiar with. The second consists in assigning papers I have not read so that I also get to learn something. I chose the second approach, meaning that there is some uncertainty about the content of the papers in the proceedings. But, this is a fact of life when you’re doing research anyway.

2 List of Papers

You must select a paper from one of two conferences that have occurred in the last two years (2018 or 2019). These are top-tier high performance computing conferences: (i) The IEEE International Parallel and Distributed Processing Symposium (IPDPS), and (ii) the International Conference for High Performance Computing, Networking, Storage and Analysis (aka “Supercomputing”). You may not present the same paper as someone else; paper selection is first-come-first-serve. The earlier you tell me the paper that you want to present, the earlier I can put your name/paper title on the list so that no one else selects it.

You must access the papers using the IEEE Xplore Digital Library or the ACM Digital Library. You can access these directly from campus, or through the VPN if off campus, or using the library’s proxy. The links are given below for the library’s proxy.

IEEE Xplore <http://ieeexplore.ieee.org.libproxy.nau.edu/>
ACM Digital Library <https://dl-acm-org.libproxy.nau.edu/>

The direct links for the conference proceedings are below. For ACM Digital Library proceedings, you must click on the "SESSION" links.

2020 IEEE International Parallel and Distributed Processing Symposium (IPDPS)

<https://ieeexplore-ieee-org.libproxy.nau.edu/xpl/conhome/9136850/proceeding>

2019 IEEE International Parallel and Distributed Processing Symposium (IPDPS)

<https://ieeexplore-ieee-org.libproxy.nau.edu/xpl/conhome/8804711/proceeding>

2020 Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis

<https://dl-acm-org.libproxy.nau.edu/doi/proceedings/10.5555/3433701>

2019 Proceedings of the International Conference for High Performance Computing, Networking, Storage and Analysis

<https://dl-acm-org.libproxy.nau.edu/doi/proceedings/10.1145/3295500>

3 Select your own paper

You may select your own paper, provided it is interesting from a parallel/high performance computing perspective. For a reference on what is interesting, look at the papers in the proceedings above. You must seek my approval before presenting a paper you have selected.

4 Presentation

Please bring your presentation to class, preferably in PDF format and a laptop if you have one. Let me know if you need a laptop for presenting; you can likely use a classmate's laptop. Also, upload your presentation to BBLearn (which may be another way to retrieve your presentation).

5 Paper Selection

E-mail the instructor your selected paper and preferred time slot (at the end of this document). Also, add this information to BBLearn. You do not need to upload your slides to BBLearn.

6 Grading

The presentation is worth 15% of your grade.

- Clarity/Preparedness: Have you adequately prepared for your presentation? Are you able to explain concepts clearly and in sufficient detail? [5 pts]
- Key ideas/Takeaways: What did we learn from the paper? What were the most interesting things in the paper? [5 pts]
- Questions from the audience: Do you understand the paper well enough to answer reasonable questions from the audience? [5 pts]

Helpful tips:

- Include illustrative examples, which may include those that you have created yourself that are not taken from the paper.

- You may reference other papers that may support your paper. You can include content from other papers in your presentation.
- Use large enough fonts so that the audience can read your slides.
- Do not read passages directly from the paper. Technical writing does not translate well to an oral presentation. Additionally, the purpose of the exercise is to see if you can understand the main ideas of the paper and express them in your own words.
- Avoid using too many equations and notation. Try your best to explain these technical details with pictures and other explanations.

7 Schedule of Presentations

Table 1: Name and paper title.

Date: Wednesday April 7
1. Chris Keefe – Kayraklioglu et al. “A Machine-Learning-Based Framework for Productive Locality Exploitation” in TPDS 32(6):1409–1424.
2. Anthony Simard – Hashmi et al. “Machine-agnostic and Communication-aware Designs for MPI on Emerging Architectures” in IPDPS2020.
3. Yawen Peng – T. Bingmann et al. “Communication-Efficient String Sorting” in IPDPS2020.
Date: Monday April 12
1. Benjamin Couey – Tang et al. “Spread-n-share: improving application performance and cluster throughput with resource-aware job placement” in SC19.
2. Student 5 –
3. Student 6 –
Date: Wednesday April 14
1. Jordan Wright – Li et al. “Density matrix quantum circuit simulation via the BSP machine on modern GPU clusters” in SC19
2. Brian Donnelly – Zhang et al. “A Study of Single and Multi-device Synchronization Methods in Nvidia GPUs” in IPDPS2020.
3. Felicity Escarzaga – Jacobs et. al. “Towards Scalable Parallel Training of Deep Neural Networks” in MLHPC17 (workshop of SC17).
Date: Monday April 19
1. Kaitlyn Lee – Elafrou et al. “Conflict-Free Symmetric Sparse Matrix-Vector Multiplication on Multicore Architectures” in SC19.
2. Sixian Zhang – Zhang et al. “RLScheduler: an automated HPC batch job scheduler using reinforcement learning” in SC20.
3. Frederik Gantzel – Shi et. al. ”GraphPi: High Performance Graph Pattern Matching through Effective Redundancy Elimination” in SC20