

# Student Cluster Competition Lightning Talk

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# Meet the Dawgz

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**Matthew Cinnamon**  
HPCG, SST  
Computer Engineering '22  
Virginia



**Andrei Karavanov**  
HPCG, Reproducibility  
App Comp Math Sci: SC & NA '20  
Russia



**Sungchan Park**  
VPIC, HPL  
Engineering '22  
South Korea



**Thorne Garvin**  
HPL, Hardware & cluster config  
Computer Science '22  
Washington



**David Liu**  
Reproducibility, HPL  
Computer Science '21  
California

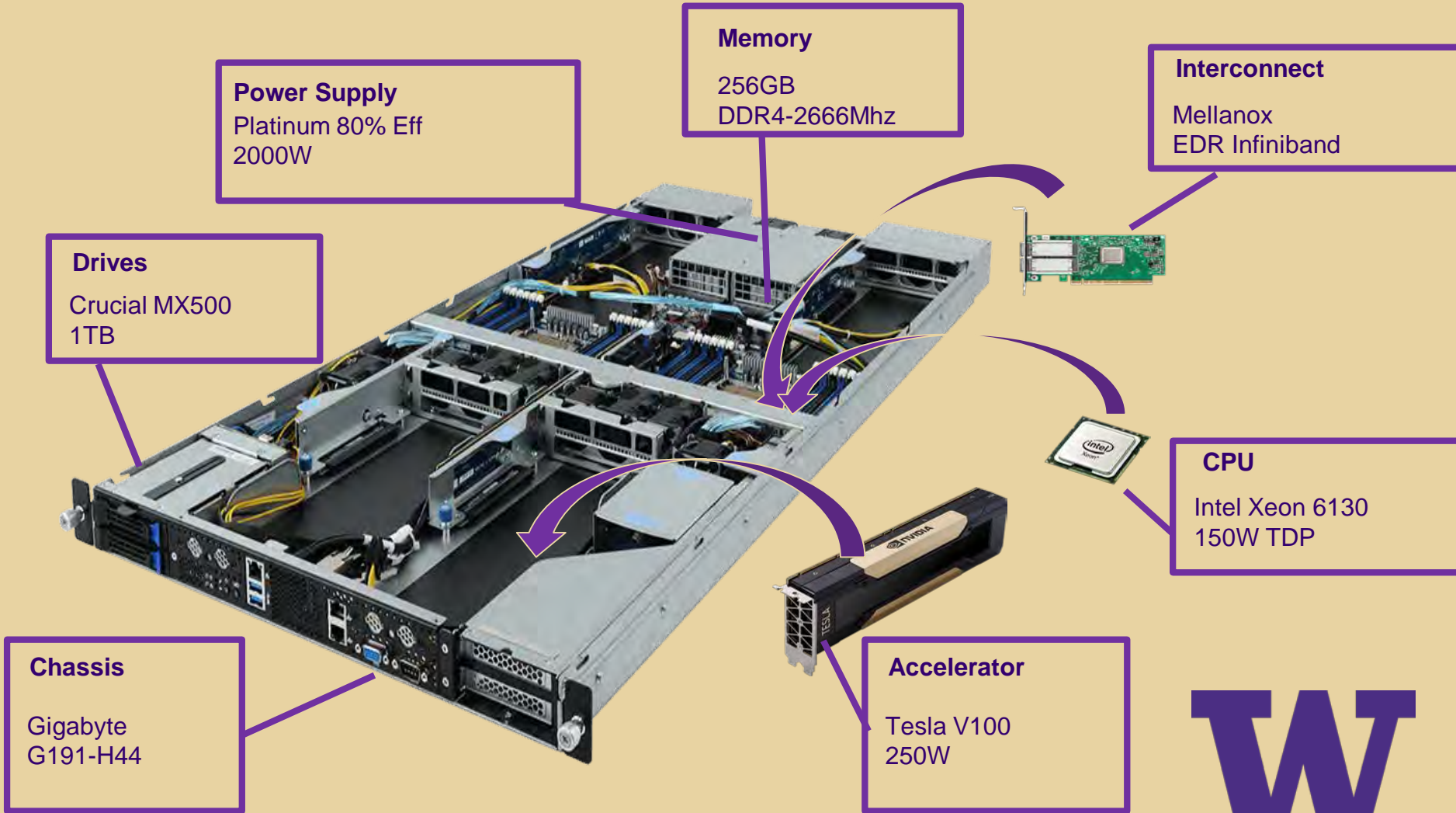


**Darius Strobeck**  
Cluster Config, IO500, SST  
Political Science '22  
Washington

- > Four different Majors
- > Three different Nationalities
- > Primarily Underclassmen
- > Three members competed in 2019's National Collegiate Cyber Defense Competition



# The Hardware



# Software Stack

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**CentOS**



OPEN MPI

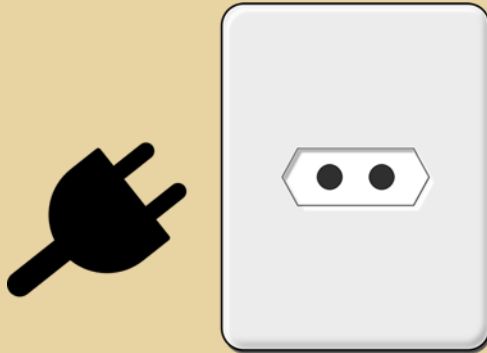


# Prep for the Competition

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- 1. Choosing the Cluster:** Utilized AWS instances to test various hardware and software system configurations
- 2. Learn Applications:** Researched and ran applications with different compilations and flags
- 3. Learn the Competition:** Looked at previous team cluster configurations and the winning strategies
- 4. Learn from Experts:** Consulted with domain experts for applications and acquired optimized binaries for benchmarks
- 5. Optimize:** Experimented with the applications and benchmarks based on our research

# Strategy



## Power Management

- **Extreme power efficiency** - Platinum power supplies and no switch
- Innovative airflow design for **effective cooling** in a 1U server while using minimal power
- TDP of loaded system is ~2800W, monitored using nvidia -smi with downclocking available during HPL



## Time Management

- **VPIC first on Cluster** - Checkpointing allow for easy recovery from power loss
- **Reproducibility after on Cluster** - Long runtime and difficult analysis of results makes hard to block time
- **SST first on Cloud** - Well suited for cloud infrastructure



# Acknowledgement

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## Thanks to our Mentors and Sponsors



**Tony Liu**  
Grad Student  
Mentor  
CS, PhD Student  
Washington  
State University



**Andrew  
Lumsdaine**  
Chief Pizza  
Supplier  
University of  
Washington  
PNNL



**Sean Smith**  
Sponsor Mentor  
AWS  
SCC'16 Alum

