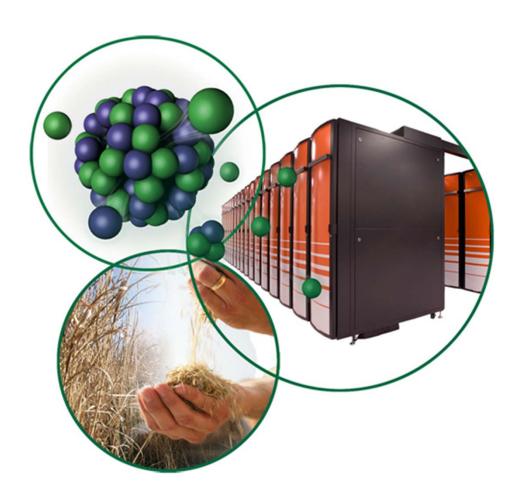
## P2S2 Panel: Is Hybrid Programming a Bad Idea Whose Time Has Come?



**Vinod Tipparaju** 



## Challenges in realizing hybrid models

- Mixing high-level and low-level models is complex, machines are getting more and more complex..
- Sharing data structures between models can sometimes mean unnecessary data copies.
- Dealing with hybridization of low-level and high-level models is complex, resolving issues here will only be to find out that increasing hardware complexities are yet to be dealt with:
  - Although MPI was not conceived to work at this level, most application developers write MPI code (low-level model)
- Increasing the complexity of a model doesn't always balance out the increase in complexity of systems.



## Challenges in supporting it

- Debugging for errors in homogeneous apps is very difficult at petascale today, it will be extremely challenging in the future
- Performance debugging will be a nightmare
- Good idea, but not when exposed to scientific application



## **Summary**

- Hybrid programming could be an unnecessary complexity, alternatives: general or domain specific abstractions
  - Using an inter-node model combined with intranode model is already prevalent (e.g. MPI+OpenMP) – no objections to that

