CS/ECE 752:
Advanced Computer Architecture I
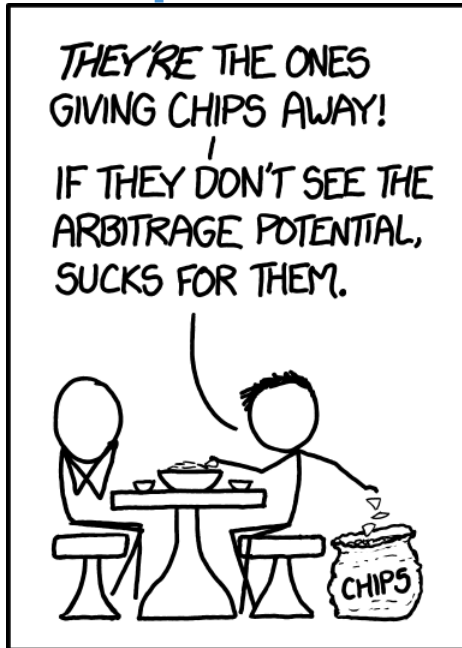
Source: XKCD

Professor Matthew D. Sinclair

Chiplets

In-Class Assignment

→ wires may limit   → better to manufacture

- With a partner, answer the following questions:
  - Are chiplets a one-time boost? (Are chiplets the new multicore?)

⇒ integr. comps w/ different techs. / heterogeneity

⇒ can only have so many chiplets/die ⇒ physics help here

⇒ w/ more chiplets, comm. dominates
  ↳ NUMA, ILC

- In 3 minutes we'll discuss as a class

Conclusion

- Moore's Law petering out (even for GPUs – Dark Silicon paper)
  - Can't scale a single GPU much/any further
  - Solution: multi core-like GPUs (and CPUs – analogy breaks down)!
- Lots of opportunities for interesting research!
  - Open questions: workload partitioning, imbalance, scheduling, coherence, consistency, synchronization
- Rely on data locality to avoid inter-chiplet communication
  - Redesign scheduler to avoid/exploit temporal locality across chiplets
  - Redesign page placement to avoid/exploit temporal locality per chiplet
  - …