

# Future of the Field

# Why Care?

The long-term well being of numerical linear algebra will depend upon how well we articulate its importance to the scientific community and the larger public.

Hints from the Past

- Matrix factorization Paradigm
- Krylov Methods and Preconditioning
- The SVD and QR algorithm
- FFT and Other Fast Transforms
- Backward Error Analysis
- IEEE Floating Point Standard
- LAPACK, Matlab, Software

Anticipating the Future

# Bullets

- New Aps in Web science, social science, bioscience.
- Identifying new structures to exploit.
- Multicore
- Low rank approx, dim reduction,...
- Expanded role of error Analysis
- Tensor manipulations

# Changing Mindsets

1. Compute intensive  $\rightarrow$  data intensive
2. Big  $n$   $\rightarrow$  Big  $d$  (1,2,3,infinity)
3. Evolving niche in CSE
4. More recursion, hierarchical thinking.
5. Moving Boundaries: Discrete/Continuous,  
Linear/nonlinear

# New Subjects on the Scene...

1. Statistics and Probability
2. Combinatorics
3. Differential Geometry
4. ???