



Deep Computing

A View from an Industrial Career

SIAM Professional Development Evening

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Brief History – How did a nice guy like me end up here!

- Undergraduate – Hobart College,
 - Time to declare a major - - Math or Chemistry?
 - Wanted to be a professor – like parents

- Graduate School – U of Delaware
 - Applied Math – most in applied analysis – break away from asymptotics & numerics – heavy emphasis on numerics

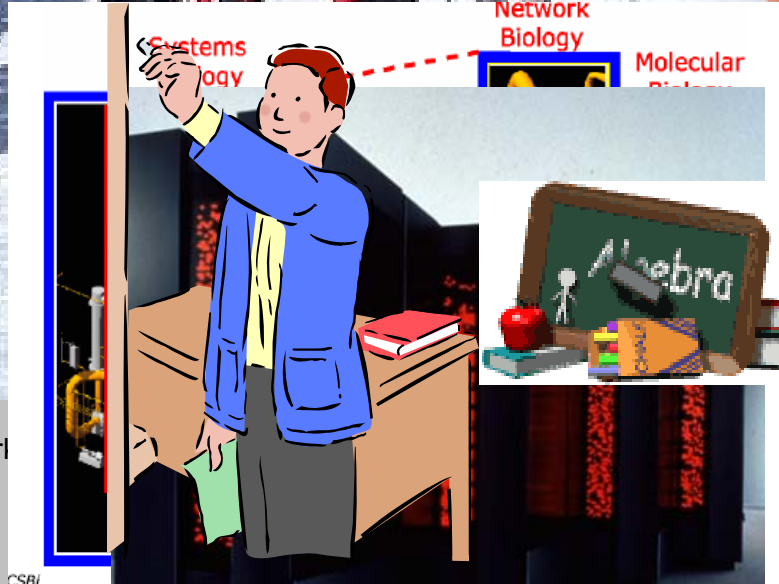
- Professor - SUNY Oswego, Math Dept
 - Taught math & cs courses, Conducted research - numerics & asymptotics

- Exxon R&E - Staff Mathematician (Adjunct - Rutgers, CS Dept)
 - R & D of numerical techniques for engineering and scientific problems

- Thinking Machines - Computational Science Advisor
 - R & D on numerical algorithms for math library, Comp Sci Advisor to Marlin

- Kendall Square Research - Senior Computational Scientist
 - Developed new visualization package, conducted benchmarks

- IBM - Emerging Solutions Exec, Deep Computing (Currently – with stints in IBM STSS, IBM Research/IBM Corp Univ. Relations, IBM Healthcare & Life Sciences)
 - Provide expertise for and overseeing development of applications on IBM's advanced architectures - high performance computing (HPC) - modeling & simulation, and provide leadership in high-end computing and simulation in such areas as systems biology, medical and diagnostic imaging, and high-end visualization.



Decision Points & Mentors

- Decisions shaped early career
 - **Applied Math vs Pure Math**
 - Physical Oceanography & Meteorology
 - Lots of PDEs
 - Almost landed in Wisconsin – in Physical Oceanography
 - **Faculty Research Grant - Argonne National Lab**
 - Developed simulation techniques for melting problems
 - Real problems!
 - **Students at Oswego questions – what really is Applied Math**
 - **Exxon E&R**
 - Even more realistic problems that mattered – solar cell, seismic forward modeling, compute resources
 - **DOE Tech Exchange Sabbatical – Argonne National Lab**
 - Parallel Computing Characterization & Performance
 - **Exxon R&E training assignment**
 - 2 Years to Life – Houston
 - **Small Company – Go away/disappear easily**
 - **Big Companies – wealth of opportunities**
- Mentors & Relationship
 - **Prof John Q. Jordan – Father -> suggested Applied Math**
 - **Mrs. Lori H. Jordan – Wife -> continued support**
 - **Prof Richard Albright @ Hobart -> suggested U of Delaware program**
 - **Profs George Hsiao, 'Skip' Lundin, & Richard Weinacht @ Delaware -> grad advisor & committee**
 - **Drs. Gary Leaf, Mike Minkoff, Paul Messina, Hans Kaper @ Argonne - colleagues**
 - **Dr. George Byrne @ Exxon R&E - colleague**
 - **Prof. Mary F. Wheeler @ U of Texas at Austin - colleague**
 - **Mr. Bob Haines @ MIT – colleague**
 - **Many collaborators and colleagues**

Advice for people in early career

■ General Themes

- Seek to drive change –
 - Don't just accept change – embrace it and drive it
 - In industry NO is an easy answer – (don't ask – tell)
- Do what you are passionate about but seek balance
- If you are not having fun – why are you spending so much doing it?

■ Kirk and Frank's Common Themes

- Communications, communications, communications
- Business Alignment
- *Demonstratable* Impact
 - Can you show it wouldn't have happened without your efforts?
- Computation Literacy
 - Knowing when *not* to compute
 - Thinking smart
 - Efficiency can matter more than being *correct* - i.e. approximations can be OK
- Powerpoint and Word - Get over it, its not a TeX world out there!!

Fun - can and does happen

