HPC² (nee ERC) History
William Faulkner, of course

I think that a man tries to be better than he thinks he will be.

I think that that is his immortality, that he wants to be better, he wants to be braver, he wants to be more honest than he thinks he will be, and sometimes he's not,

but then suddenly to his own astonishment he is.
• Senator Stennis told President Zacharias he wanted to do one last thing for MSU.
• A plaque still hangs in Oby’s where we wrote the proposal for the building in 1987.
• RCASC (Research Center for Advanced Scientific Computing) was formed 1987.

Center for Scientific Computing at MSU

Mississippi State will be the location of a new computer research center, funded by a first-year grant of $11.9 million from the Department of Defense, according to Sen. John C. Stennis.

The contract is for the largest single amount ever received by MSU for a research project.

The Research Center for Advanced Scientific Computing will conduct unique research in microelectronics and computational fluid dynamics.

President Donald Zacharias said, “I think this gives our area a significant boost in the level of scientific research being conducted. It should demonstrate clearly that this area will continue to grow in its scientific investigations and will contribute not only to the state but to the national effort.”

Although the center is expected to be a permanent part of the university, the initial contract is for five years. Only funding for the first year has been authorized, and funding for succeeding years will writers for the project are Joe Thompson and David Whitfield of aerospace engineering and Donald Trotter of electrical engineering.

The project is a result of research in progress at MSU for about 10 years in the areas of microelectronics and computa-

The center is an outgrowth of the $2.5 million Mapped Array Differential Equation Machine (MADEM) project, a joint microelectronics/CFD effort to design a supercomputer to solve aerodynamic problems.
We broke ground in late 1988.
- Over Christmas holidays in 1988, we started writing the proposal for an NSF ERC.
- The proposal was submitted in February 1989, with five minutes to spare.
We had a strong university and state commitment.
The NSF ERC for Computational Field Simulation started in April 1990, and quite a decade it was.
We moved into the original building in January 1991.
Walter Massey, NSF Director, dedicated building in May 1991.
We unsuccessfully attempted a SGI Silicon Studio in 1994, got burned, but spun off a successful computer art program at MSU - Guy Williams, *Lord of the Rings*. 
A mule will work for a man faithfully for ten years –

for the pleasure of kicking him once.
• Trotter replaced me as NSF ERC director in 1995.
• I joined an industry-led team to win the DoD PET contract in 1996, and was appointed by President Clinton to PITAC in 1997.
In 1999 Rita Colwell, NSF Director, singled out the NSF ERC at MSU as an example of the NSF ERC program success.

“How would you characterize engineering’s role within NSF?”

“Absolutely critical. Engineering successes, especially in research centers, are a bridge to discovering new applications. For example, I am very pleased with the Mississippi Engineering Research Center, which effectively demonstrates that you can institute change in a very positive way, in an architecturally and aesthetically pleasing facility filled with and run by very bright people, with companies located close enough to facilitate partnership efforts. That is what engineering centers should be.”

— ASEE PRISM, January 1999
• With the presence of the NSF ERC, Mississippi landed Nissan in 2000, and that led to CAVS.

• The ERC led university/industry team to win the second DoD PET contract in 2001, $108 million.
The ERC graduated successfully from the NSF ERC program in 2001.
But you can't be alive forever and you always wear out life long before you have exhausted the possibilities of living.

And all that must be somewhere... all that could not have been invented and created just to be thrown away...
• Remote Sensing Technologies Center created in 1999 from a NASA Challenge grant.
• David Shaw (Weed Science) was named the first director of RSTC.
• RSTC was collaborative with a number of centers with similar missions; one of these, the Computational Geospatial Technology Center, was a part of the graduated ERC.
• The decision was made to bring four centers together to create the GeoResources Institute in 2002.
• Brad Carter became NSF ERC director in 2001, as Trotter moved to the Research Office to organize CAVS as Nissan came.
• Construction started on the CAVS buildings in October 2002.
• The CAVS buildings were dedicated in December 2003.
• Rand German came to MSU from Penn State as CAVS Director in 2005.
• Center for Computational Sciences was created in 2003.
• Math, Physics, Chemistry, Biology.
• Mark Novotny (Physics) was first director.
• Ratnasingham Shivaji (Math) became director in 2006.
An Institute for Computational Science and Engineering
Faulkner again

It is because a fellow is more afraid of the trouble he might have than he ever is of the trouble he's already got.

He'll cling to the trouble he's used to before he'll risk a change.
• Dave Marcum became ERC Director in 2002, as Carter left for Kentucky.

• In 2003, SimCenter, PET, GRI, CAVS, CCS formed a confederation for computational science and HPC, carrying forward the ERC name.

• ERC became HPC\(^2\) in 2005.
Growth and Evolution

Research Expenditures
> $260,000,000

Computational Engineering Program
> 75 MS graduates
> 25 PhD graduates

NSF ERC

ERC
Comp Physics, Comp Systems, GeoTech, PET, SimCenter, VAIL

ERC - An Institute for Computational Science and Engineering
CAVS  CCS  GRI  PET  SimCenter

426 Total HPC² Personnel
55 Academic Faculty
37 Research Faculty
15 Postdoctoral
93 Research Associates
31 Staff
114 Graduate Students
81 Undergrad Students
Aggregate Computing Capabilities (GFLOPS)
Top 500 Supercomputer Sites List

- Published biannually by the University of Tennessee-Knoxville and the University of Mannheim since June 1993.

- Lists the 500 most powerful computers in the world based on LINPACK Benchmark

- MSU HPC² has appeared on 16 of 22 lists since June 1996.

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Raptor – 512 nodes (2048 cores) - 10.6 TFLOPS
Legacy of the NSF ERC

- Fourteen new faculty positions.
- PhD Programs in Math and Computer Science
- Computer art program
- Ten-fold increase in HPC research funding
- Repeatedly on Top 500 HPC Sites list
- Nissan in Mississippi
- Membership on PITAC
- Leadership on $108M DoD PET contract
- Culture of multidisciplinary research at MSU
Dewitt Jones, a *National Geographic* photographer, once told me, talking about still looking for the great photograph after getting a good one:

*Look for what's wanting to happen.*