The ACTS Toolkit

Next Steps

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http://acts.nersc.gov/workshop

- participants.html
- Coming soon:
  - Group picture
  - Update information about the workshop

Trajectory of most computational tools

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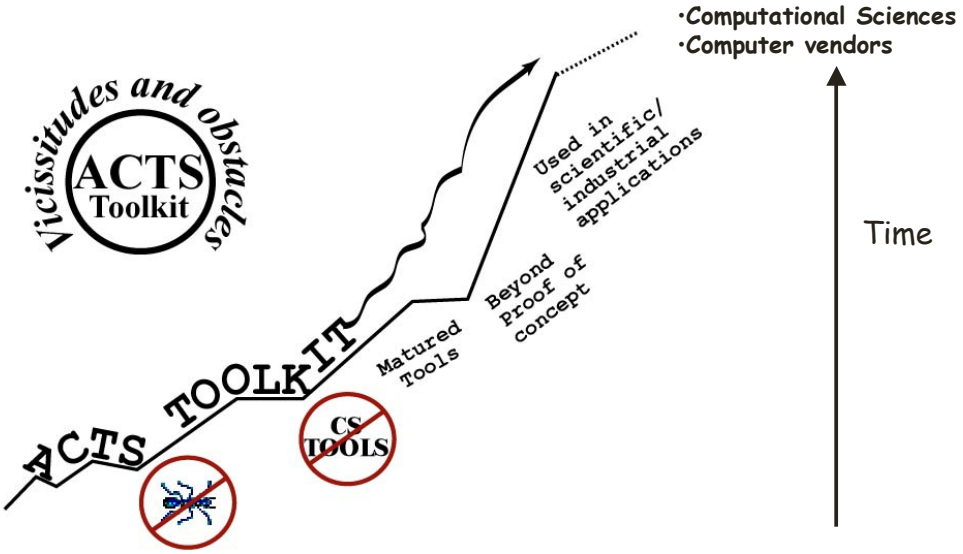

Success Stories

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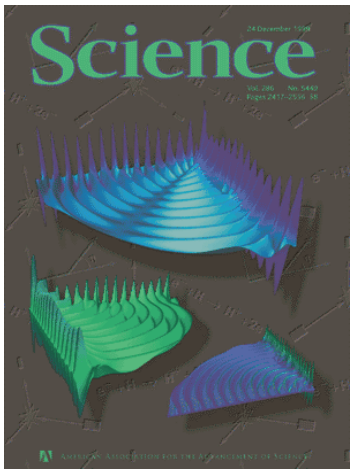

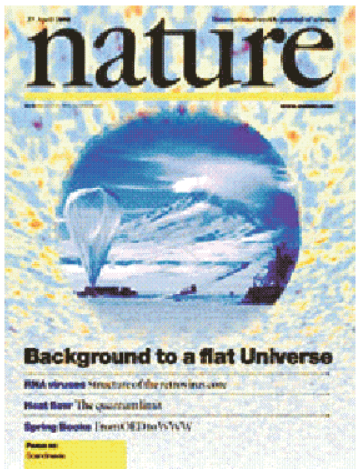

SuperLU: *Scattering in a quantum system of three charged particles (Rescigno, Baertschy, Isaacs and McCurdy, Dec. 24, 1999).*

ScaLAPACK: *Cosmic Microwave Background Analysis, BOOMERanG collaboration, MADCAP code (Apr. 27, 2000).*

Tools *under the ACTS umbrella*

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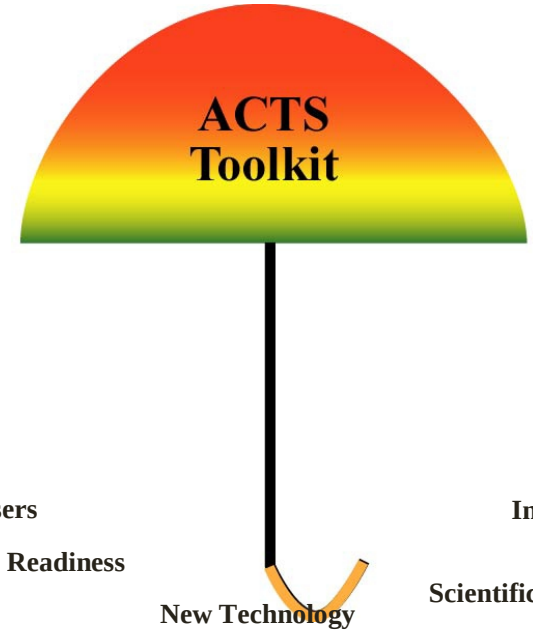

Feedback from Users

Interoperability

Readiness

Scientific Communities

New Technology

Tools under ACTS

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What you haven't seen from ACTS yet. . .

Code Development

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- **POOMA** (Parallel Object-Oriented Methods and Applications): C++ abstraction layer between algorithm and platform (similar to HPF)

Infra-structural (cont.)

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- **Tulip**: C++ applications with threads, global pointers and other parallel operations
- **ATLAS** (Automatically Tuned Linear Algebra Software), **PHiPAC** (Portable High Performance ANSI C): automatic generation of optimized numerical software (mainly BLAS)
- **PETE** (Portable Expression Template Engine): efficient C++ operator overloading through expression templates

ACTS: *Interoperability Issues*

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- Can tools under ACTS interoperate?
- Do users need to learn another programming interface or language? more commands?!
- Can ACTS use a simple representation without compromising its functionality?

Approach to interoperability

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- CCA
- BABEL
- Problem Solving Environments
  - NetSOLVE
- Commercial Packages
- MATLAB
- Python + ACTS = PyACTS interface

Interoperable interface

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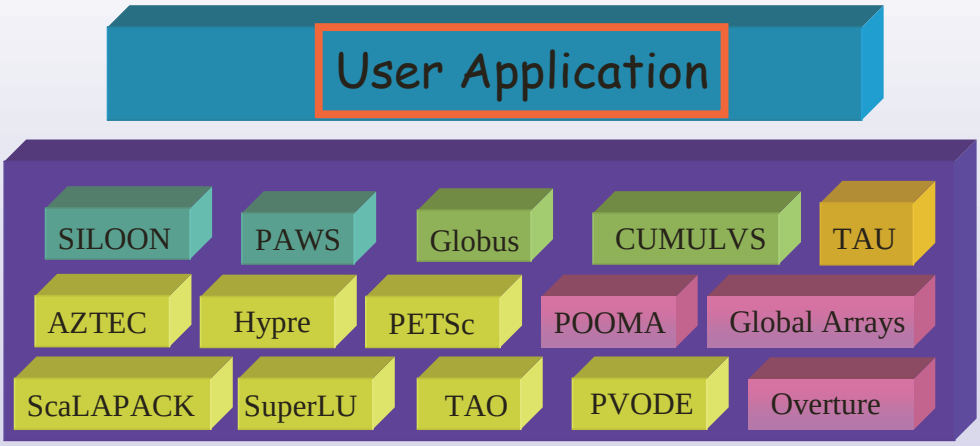

PyACTS

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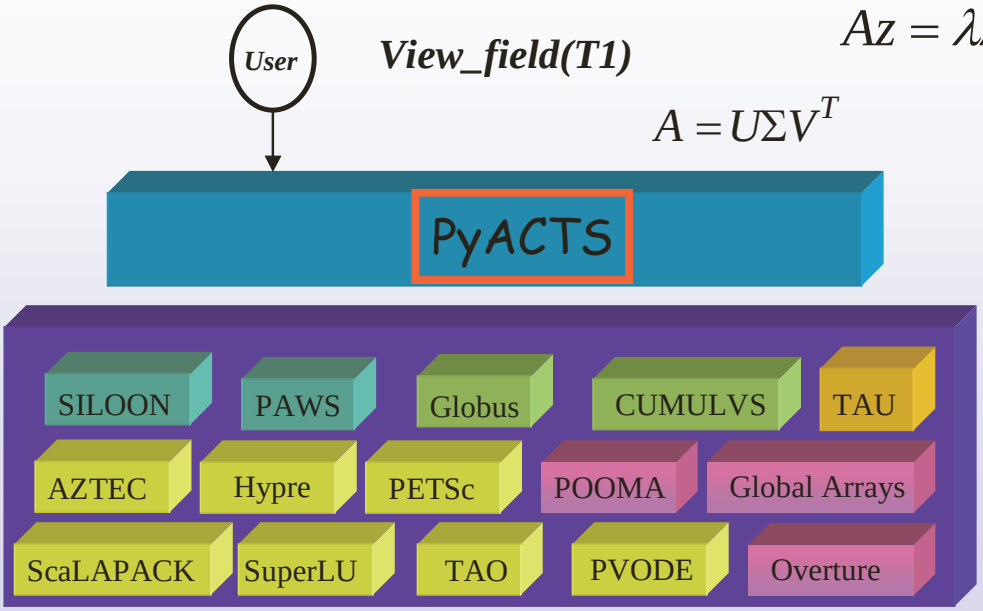
Educational Outreach

$Ax = b$

$Az = \lambda z$

$A = U\Sigma V^T$



PyACTS

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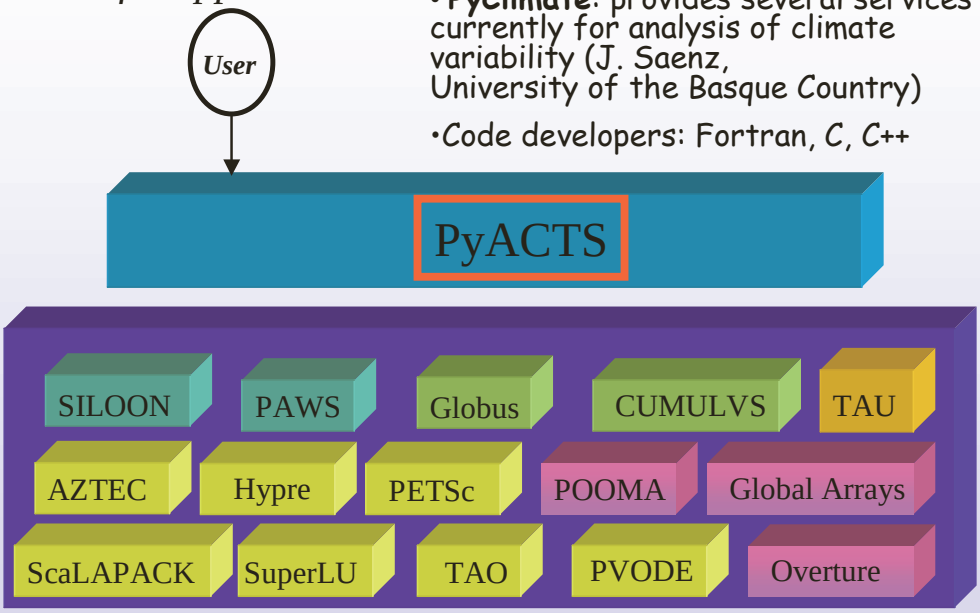
Scientific Applications

- **PyClimate**: provides several services currently for analysis of climate variability (J. Saenz, University of the Basque Country)
- Code developers: Fortran, C, C++



Tool interoperability

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Make services available from one toolkit to the other

- **Tool reusability**
- Solutions for a broader range of problems
- Increase visibility of a wider spectrum of computational services
- Improve code portability and further optimization
- Improve learning curves

Next Steps
Where/How can one Start?

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- Tool Installation
- Code Profiling - Code Development
- Beginners -> Advanced users
- Development of new libraries compliant with other existing software tools

Frameworks
Scientific Computing and Programming

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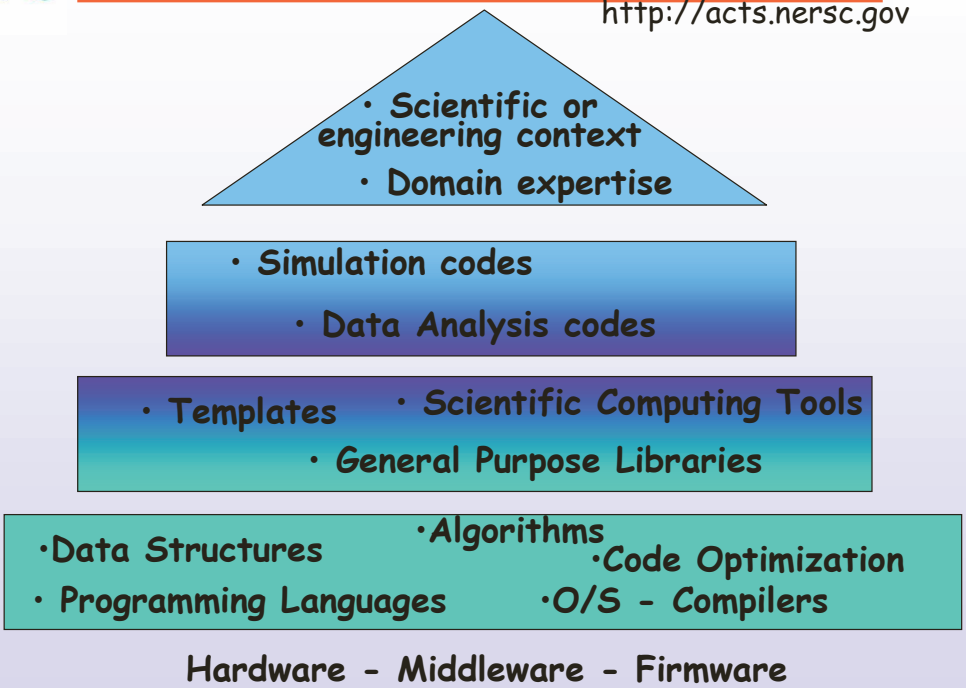

Frameworks
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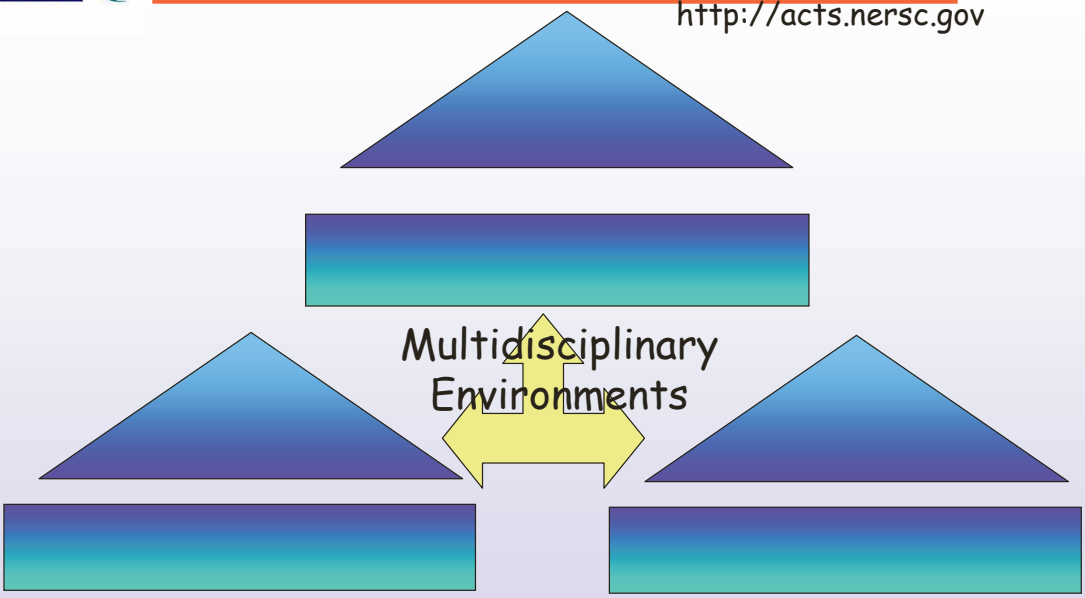

Hardware - Middleware - Firmware

Next Steps
ACTS SUPPORT @ NERSC

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- Visitor program
- Scientific Collaborations
- Tool Development and collaborations
- Reaching out other communities
  - Supercomputing centers
  - Industry (computer and others)
  - Conferences
  - Workshops
- Next phase of ACTS

acts-support@nersc.gov

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