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INSTITUTE FOR SUSTAINED PERFORMANCE, ENERGY, AND RESILIENCE

Model-based Code Refactoring and Auto Tuning

Bob Lucas and Jacque Chame (USC)
Mary Hall and Bob Wheeler (Utah)
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SUPER Team

INSTITUTE FOR SUSTAINED PERFORMANCE, ENERGY, AND RESILIENCE

Paul Hovland
K. Narayanan
Stefan Wild

Argonne NATIONAL LABORATORY

Lenny Oliker
Sam Williams

BERKELEY LAB

B. de Supinski
Todd Gamblin
Chun Leo Liao
Kathryn Mohror
Daniel Quinlan

Lawrence Livermore National Laboratory

Kevin Huck
Allen Malony
Boyana Norris
Sameer Shende

UNIVERSITY OF OREGON

Eduardo D'Azevedo
Philip Roth
Patrick Worley

OAK RIDGE National Laboratory

Laura Carrington
Ananta Tiwari

UCSD

Rey Chen
J. Hollingsworth
Sukhyun Song

UNIVERSITY OF MARYLAND

Rob Fowler
Anirban Mandal
Allan Porterfield
Raul Ruth

Renci

Jacque Chame
Pedro Diniz
Bob Lucas (PI)

USC UNIVERSITY OF SOUTHERN CALIFORNIA

Shirley Moore

UTEP

George Bosilca
Anthony Danalis
Jack Dongarra
Heike McCraw

ICL UT

G. Gopalakrishnan
Mary Hall
Bob Wheeler

THE UNIVERSITY OF UTAH

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Broadly Based Effort

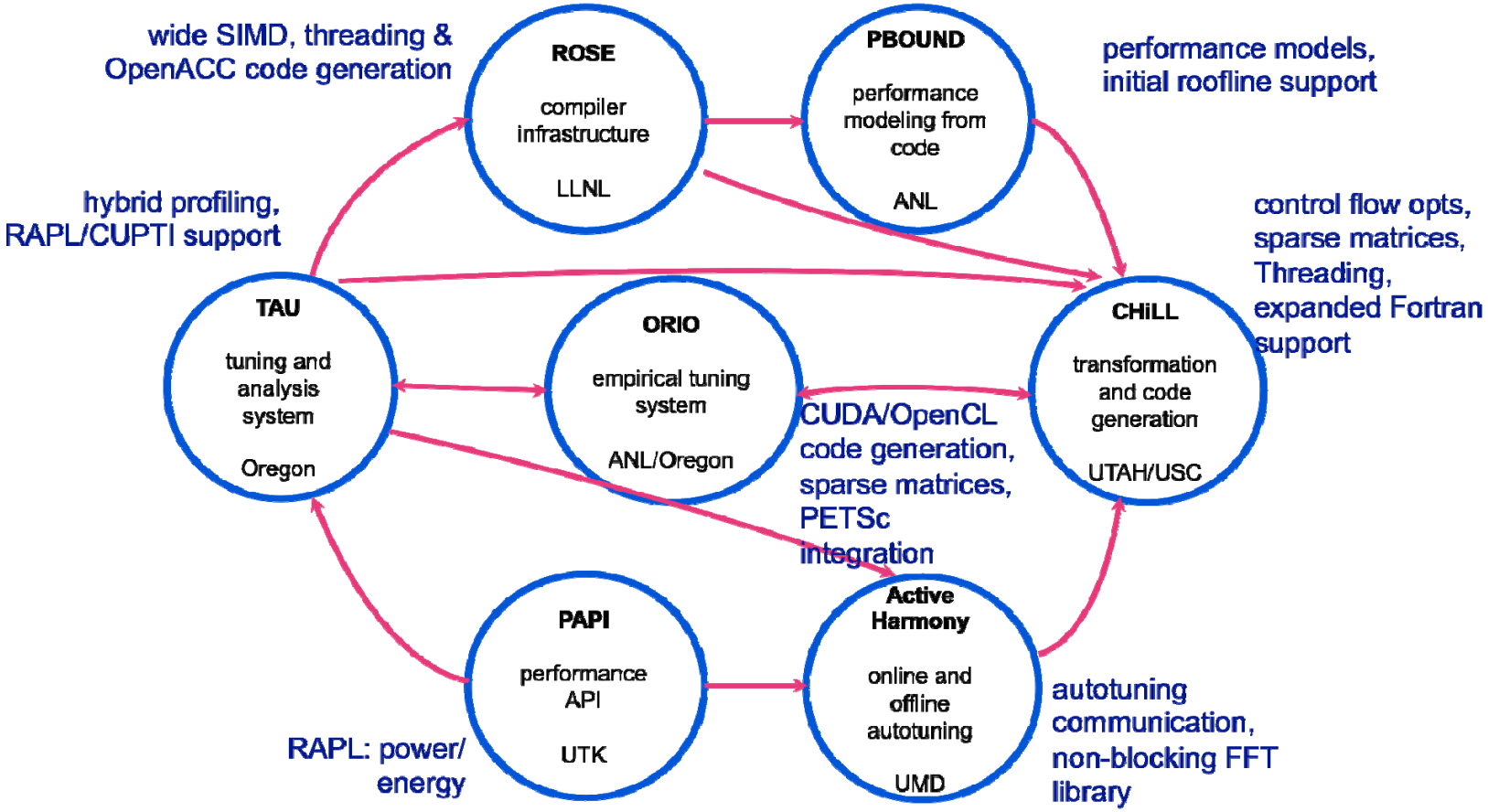
All PIs have independent research projects

- **SUPER alone isn't enough to support any of its investigators**
- **SUPER leverages other work and funding, our science pipeline**

SUPER contribution is integration, results beyond any one group

- **Follows SciDAC-2 PERI model (tiger teams and autotuning)**
- **Collaboration extends to others having similar research goals**

Autotuning



Tools must support architectural changes and application requirements.

Tools are extended in response to application tuning.

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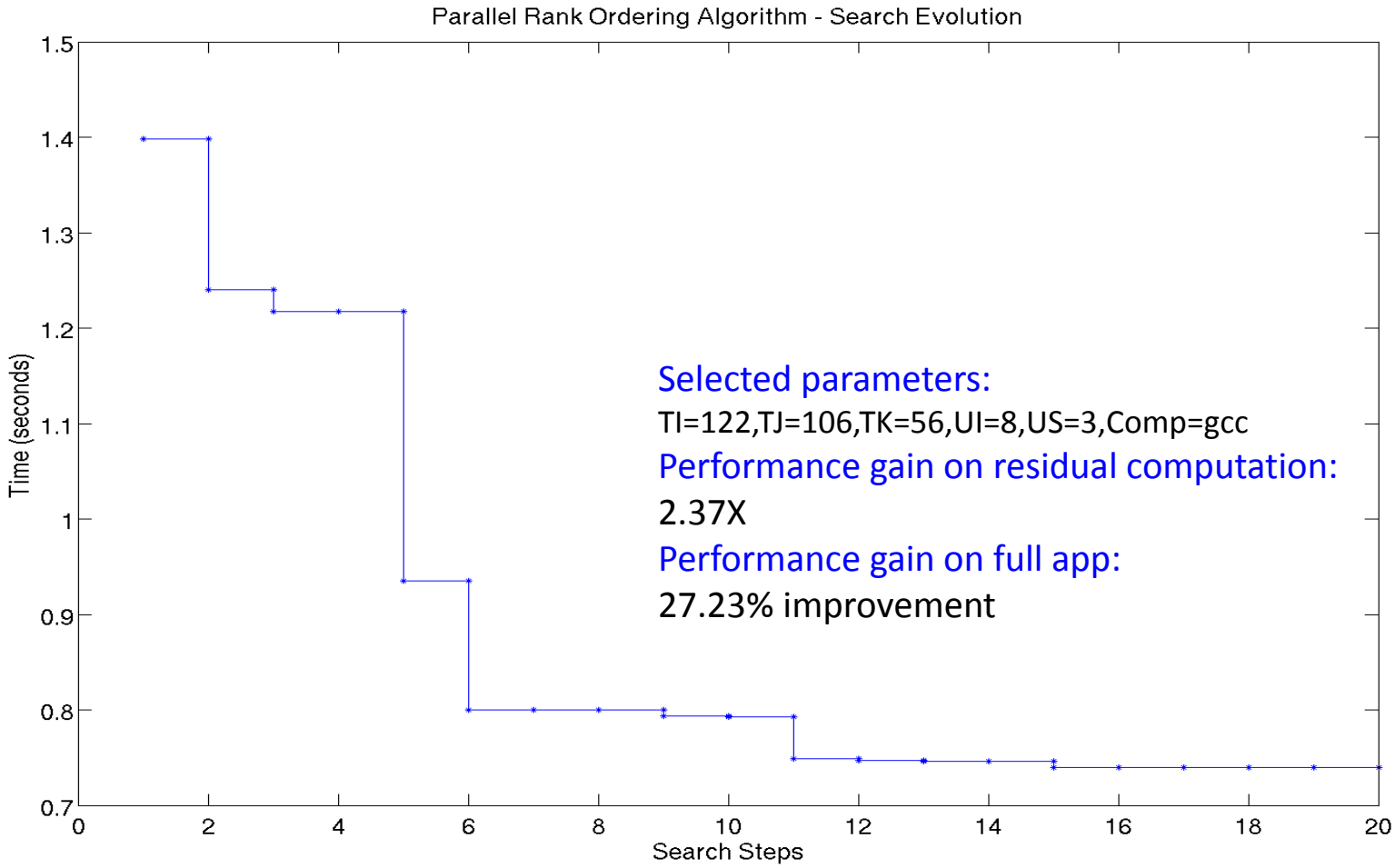
SMG2000 Example

Parallel search evaluates 490 points and converges in 20 steps.



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PAID Objective

Extend autotuning research to Blue Waters Petascale scientific applications.

- **To date we've only worked with DOE codes.**

Work with Blue Waters staff to identify suitable computational kernels.

- **We need Blue Waters expertise as we're missing the rest of SUPER.**
- **Dense and sparse matrix kernels, stencils, and geometric multigrid are likely good candidates.**

Install CHiLL and perform autotuning experiments.

Offer optimized code variants to Blue Waters investigators.