JLPC
future JLESC
PUF *(Partnership University Fund)*
Organization

JLESC
2014

PUF NextGN
Jan 2014

Summer
Schools

Workshops

Visits

Partnership University Fund

NextGN:
Preparing for Next Generation Numerical Simulation Platforms

PUF

- Partnership University Fund

- <!-- obscured by image -->

YALE'S PROF. JAMES ROTHMAN, 2011 PUF LAUREATE, WINS 2013 NOBEL PRIZE IN MEDICINE.

James Rothman, Fergus F. Wallace Professor of Biomedical Sciences Professor and Chair of the Department of Cell Biology at Yale University, was awarded the 2013 Nobel Prize for his discoveries of machinery regulating vesicle traffic, a major transport system in our cells. He shares the Nobel Prize in Medicine with Randy Schekman (University of Berkeley) and Thomas Südhof (Stanford University).
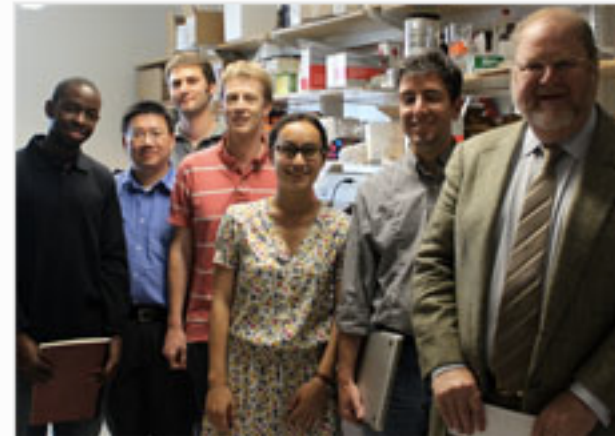
Professor James Rothman with students and researchers from Yale University and Ecole Normale Supérieure.

education.

- Extremely competitive (8% AR), top level research

puf
PARTNER UNIVERSITY FUND
a program of FACE

GRANTEES 2013 – 2016

The members of the PUF Grant Review Committee met on May 20th, 2013 under the co-presidency of Allan Goodman and Christophe Laux, in order to choose the laureates among the grants applications of the sixth call for projects. Altogether, five partnerships were selected and subsequently approved by the PUF Steering Committee and the Board of Trustees of FACE. Two projects were selected in Humanities and will be co-financed by PUF and the **Andrew W. Mellon Foundation**.

The selected partnerships are listed hereinafter (without merit order):

Argonne National Laboratory

Search

🔍

f   🐦   ✉   ↗   g+1

🖨 Print   📡 RSS

Quantum Cryptography with Silicon Photonics (CRYSP)
University of Delaware – Centre National de la Recherche Scientifique

Preparing for Next Generation Numerical Simulation Platforms
Argonne National Laboratory- Institut National de Recherche en Informatique et en Automatique (INRIA)

Advancing the synthesis of ecology and evolution through the integration of mathemat observational and experimental models.
University of Arizona- Ecole Normale Supérieure

FACE
FRENCH AMERICAN CULTURAL EXCHANGE

HOME   BOOK   CINEMA   VISUAL ARTS   PERFORMING ARTS   MUSIC   EDUCATION

Partner University Fund
Grantees 2013

PUF NextGN

- Lead partners:
  - Inria: Franck Cappello → may need to find another lead for Inria
  - ANL: Marc Snir

- Additional Partners
  - UIUC/NCSA: William Kramer
  - CNRS: Sylvie Joussaume

PUF NextGN

- Work package 1:

  Algorithms with reduced communications.

  Leaders: Jed Brown (Paul) (ANL), Laura Grigori (Inria, Paris), Bill Gropp (UIUC), Radek Sponpor (CNRS, Paris)

  Performance model, conditioning of the Krylov basis, user-defined non-blocking collectives, combine pipelining with TSQR-based Krylov methods

- Work package 2:

  Reducing MPI and Charm++ communication overheads
  Leaders: Pavan Balaji (ANL), Emmanuel Jeannot (Inria, Bordeaux), Sanjay Kale (UIUC), Radek Sponpor (CNRS)

  Topology-based mapping model, tools for automatic network discovery, Interpolation based large scale applications modeling, distributed placement algorithms, dynamic remapping

- Work package 3:

Reducing overhead of Input/Output in numerical simul.

Leaders: Robert Ross (ANL), Gabriel Antoniu (Inria, Rennes), Rob Pennington (UIUC), Yann Meurdesoif (CNRS, Paris)

Characterize I/O, storage, and data analysis requirements, architecture joining Damaris and IOFSL, new approach to data management, automated data movement across a hierarchical storage system

- Work package 4:

Improve Fault tolerance for numerical simulations by improving checkpointing protocols and parameters
Leaders: Rajeev Thakur (ANL), Franck Cappello (Inria), Luke Olson (UIUC), Marie-Alice Foujols (CNRS)

Fully distributed recovery, Process clustering, fault tolerance algorithms based on resilient MPI, Algorithm based resilience

PUF NextGN

- Work package 5:

Verification of numerical simulation correctness and uncertainty quantification
Leaders: Paul Hovland (ANL), Laurent Hascoet (Inria)

Adjoints of MPI codes, proving the semantic correctness of the communication adjoints, Derivatives of DAG-based codes, Uncertainty quantification for practical applications

- Work package 6:

Improving the performance of numerical simulations on Cloud environments

Leaders: Kate Keahey (University of Chicago, ANL), Frederic Desprez (Inria, ENS Lyon)

Model for VM and storage object placement, user controlled object placement, workflow-based experiments

PUF NextGN

- Work package 7:

Performance Metrics, Modeling and simulation at extreme scale

Leaders: Marc Snir (ANL), Arnault Legrand (CNRS, Grenoble), Bill Kramer (UIUC)

Record, archive, index, analyze and correlate events and logs from the Blue Waters and Mira, Validation of performance modeling methodology, Efficient simulation support (critical path), Scalable and accurate network modeling

PUF NextGN

- Summer Schools
  - Performance metrics, modeling and simulation at extreme scale.

    The speakers will be: Bill Kamer (UIUC), Arnaud Legrand (CNRS), Laxmikant Kale (UIUC) → Sophia Antipolis
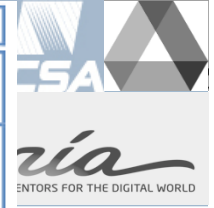
  - Data storage, management and analytics at extreme scale.

    The speakers will be: Robert Pennington (UIUC), Robert Ross (ANL), Gabriel Antoniu (Inria) → ?

  - Fault Tolerance and Resilience at extreme scale.

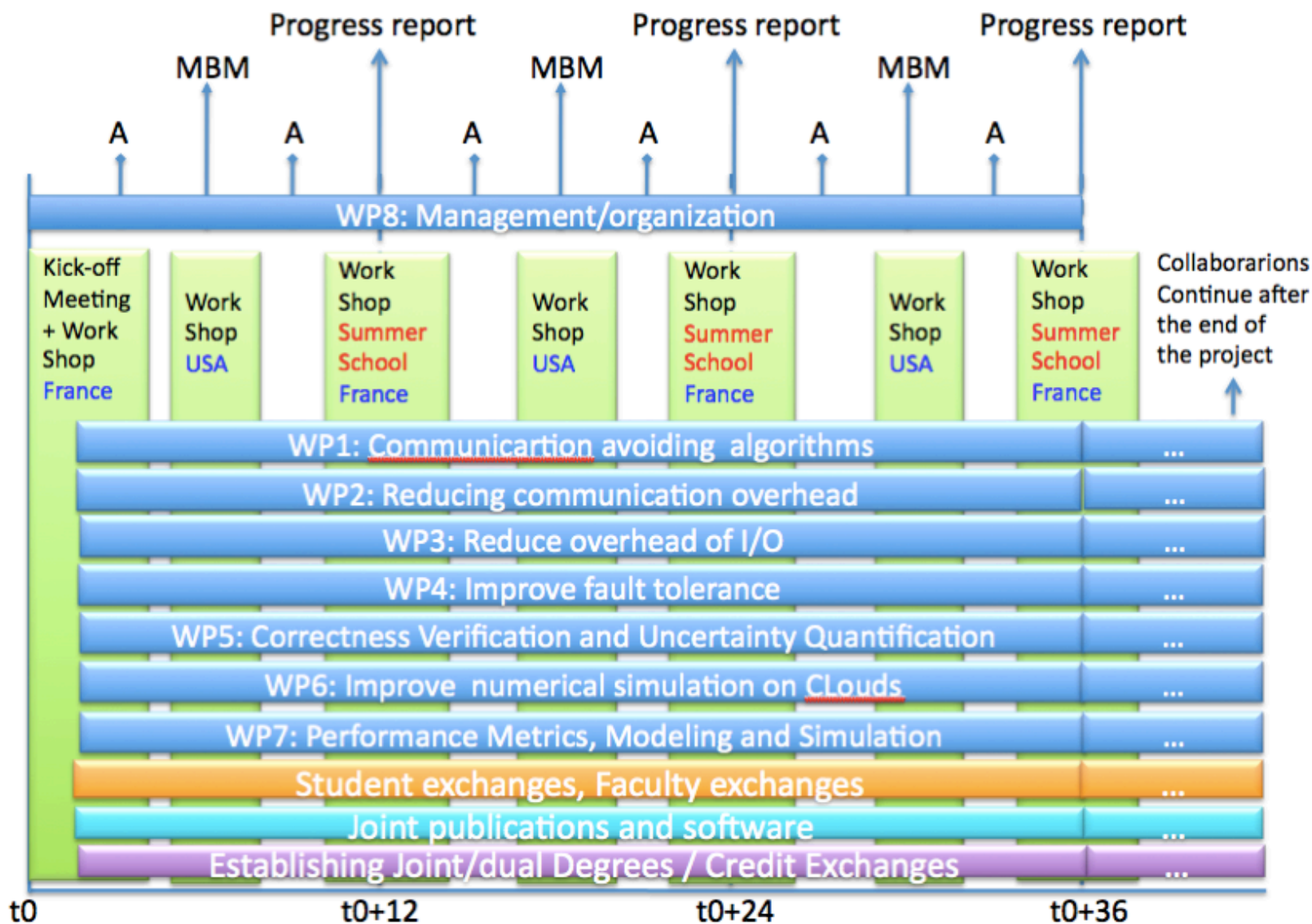   The speakers will be: Marc Snir (ANL), Franck Cappello (Inria), Ana Gainaru (UIUC), Yves Robert (ENS) → ?

	Year 1	Year2	Year3
Student Exchanges			
Ph.D Fr→Us	WP1: 1 for 1 month WP2: 1 for 2 months WP3: 1 for 1 month WP4: 1 for 1 month WP4: 1 for 2 months WP6: 1 for 2 months WP7: 1 for 1 month	WP1: 1 for 1 month WP2: 1 for 1 month WP3: 1 for 1 month WP4: 1 for 1 month WP4: 2 for 1 month WP5: 1 for 1 month WP6: 1 for 1 month WP7: 1 for 2 weeks	WP1: 1 for 1 month WP2: 1 for 1 month WP3: 1 for 1 month WP4: 1 for 1 month WP4: 2 for 2 month WP5: 1 for 1 month WP6: 1 for 1 month WP7: 1 for 1 month
Master Fr→Us	WP4: 1 for 2 months	WP4: 1 for 1 month WP4: 1 for 1 month	WP4: 1 for 1 month WP4: 1 for 1 month
Ph.D Us→Fr	WP3: 1 for 2 month WP4: 1 for 1 month WP7: 1 for 1 month	WP4: 1 for 1 month WP5: 1 for 1 month WP7: 1 for 2 weeks	WP4: 1 for 1 month WP5: 1 for 1 month WPA7: 1 for 1 month
Master Us→Fr	WP6: 1 for 1 month	WP6: 1 for 2 weeks	WP6: 1 for 2 weeks
Faculty Exchanges			
Researcher Fr→Us	WP1: 1 for 2 weeks WP2: 2 for 1 week WP3: 1 for 1 week WP4: 1 for 2 months WP4: 1 for 2 weeks WP5: 1 for 1 month WP6: 1 for 1 month WP7: 1 for 2 weeks	WP2: 2 for 2 weeks WP3: 2 for 1 week WP4: 1 for 2 months WP4: 1 for 2 weeks WP5: 1 for 1 month WP6: 1 for 1 month WP7: 1 for 2 weeks	WP1: 1 for 2 weeks WP2: 2 for 1 week WP3: 2 for 1 week WP4: 1 for 2 months WP4: 1 for 2 weeks WP5: 1 for 1 month WP6: 1 for 1 month WP7: 1 for 2 weeks
Postdoc Fr→Us	WP4: 1 for 2 months WP6: 1 for 1 month	WP3: 1 for 1 month WP4: 1 for 2 months WP6: 1 for 1 month	WP4: 1 for 2 weeks WP6: 1 for 1 month
Researcher Us→Fr	WP1: 1 for 2 weeks WP2: 1 for 2 weeks WP3: 1 for 2 weeks WP4: 2 for 1 week WP5: 1 for 1 month WP6: 1 for 2 weeks WP7: 1 for 2 weeks	WP1: 1 for 2 weeks WP2: 1 for 2 weeks WP3: 1 for 2 weeks WP4: 1 for 1 week WP5: 1 for 1 month WP6: 1 for 2 weeks WP7: 1 for 1 month	WP1: 1 for 2 weeks WP2: 1 for 2 weeks WP3: 1 for 2 weeks WP4: 1 for 1 week WP5: 1 for 1 month WP6: 1 for 2 weeks WP7: 1 for 2 weeks
Postdoc Us→Fr	WP2: 1 for 2 weeks	WP2: 1 for 2 weeks WP3: 1 for 1 month	WP2: 1 for 2 weeks WP5: 1 for 1 month

PUF NextGN

Progress report   Progress report   Progress report

MBM   MBM   MBM

A   A   A   A   A   A

WP8: Management/organization

| Kick-off Meeting + Work Shop France | Work Shop USA | Work Shop Summer School France | Work Shop USA | Work Shop Summer School France | Work Shop USA | Work Shop Summer School France | Collaborarions Continue after the end of the project |

WP1: Communicartion avoiding algorithms ...

WP2: Reducing communication overhead ...

WP3: Reduce overhead of I/O ...

WP4: Improve fault tolerance ...

WP5: Correctness Verification and Uncertainty Quantification ...

WP6: Improve numerical simulation on CLouds ...

WP7: Performance Metrics, Modeling and Simulation ...

Student exchanges, Faculty exchanges ...

Joint publications and software ...

Establishing Joint/dual Degrees / Credit Exchanges ...

t0   t0+12   t0+24   t0+36

A: Quarterly Audio-conferences, MBM: Management Board Meetings, every 6 Months
Progress report: will be sent every year by July 1st. The schedule considers a kickoff (t0) in July 1st.

Project schedule

Joint Laboratory on Extreme Scale Computing

JLESC

JLESC Purpose

- Establish an international joint laboratory on extreme scale computing

- Making the bridge between Petascale and Exascale computing,

- Following the model of the Joint Laboratory on Petascale Computing (JLPC).

- JLESC initial partners: INRIA-NCSA-ANL (JLPC)

+ Riken Advanced Institute for Computational Science, Jülich Supercomputing Center, Barcelona Supercomputing Center.

- JLESC will also involve computer scientists, scientists and engineers from other disciplines and from industry

Objectives and topics

Scope and Objectives

- Research topics related to computational and data focused simulation and analytics at extreme scale.

  Will produce original ideas, publications, research reports and open source software to address the most critical issues in advancing from petascale to exascale computing.

Research Topics

- Parallel programming models and libraries,

- Numerical algorithms and libraries,

- Parallel I/O systems and libraries,

- Data analytics, graph algorithms,

- Resilience,

- Performance analysis and modeling, and tools.

Activities

- A 3-day workshop every 6 months with all JLESC partners. The purpose of these workshops is to discuss work performed in the last six months and to plan work for the next six months.

- Researcher/student exchanges. These exchanges take the form of short and long term visits (from days to 1 year or more) at different JLESC partner sites, in order to work on joint projects.

Funding Model

- Each partner institution will provide funding to support the two JLESC activities (workshops and exchanges).

- Each institution allocates an annual budget that is managed locally and controlled both by the local representative (executive) and the JLESC director;

- Concerning the visits, whatever is the selected funding model, a researcher from institution I1 visiting institution I2 will only be supported by money provided by institutions I1 and I2.

- Each party involved in the collaboration will cover its personnel salaries.

Intellectual Property

- We will avoid intellectual property issues as much as possible by producing only joint publicly available publications and open-source software. Institutions participating in the development of software will jointly decide on the license for the software.

Facilities

- An institution involved in JLESC will provide to visitors involved in collaborations: office space and internet access, secretarial support, and make all reasonable efforts to provide them access to its local HPC resources.

Management Model

- The JLESC will have a director reporting to the steering committee every year. The director will be appointed for 2 years by the steering committee.

- The steering committee will be formed by the leader of each partner institution.

- An executive committee will gather representative of each institution (director of JLESC for this institution)

- The JLESC director will typically be one member of the executive committee.

- A scientific committee composed of external researchers of exceptional caliber will assess the progress and the output of JLESC every year during the evaluation day and suggest/recommend evolutions/adjustments.