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Julien Loiseau

Education and research

2019 - present **Research Scientist** *Los Alamos National Laboratory, Los Alamos, NM 87544, USA.* CCS-7 Co-Design research group, FleCSI team.

2018 - 2019 **Postdoctorate Researcher Associate** *Los Alamos National Laboratory, Los Alamos, NM 87544, USA.* CCS-7 Co-Design research group, FleCSI team.

2015 - 2018 **PhD in Computer Science**
CReSTIC Laboratory, University of Reims Champagne-Ardenne (URCA), Reims, France.
Title: *"Hybrids Architectures to Reach Exascale"*
Thesis Advisor: Michaël Krajecki.

2013 - 2015 **MSc in Computer Science, Development of parallel and distributed applications**
URCA, with high honors and first in graduating class.

2010 - 2013 **BSc in Computer Science**
URCA, with honors.

Research projects

FleCSI *is a compile-time configurable framework designed to support multi-physics application development.* I am working on several aspects of FleCSI such as Kokkos support and new topology development.

FleCSPH *is a multi-physics compact application that exercises FleCSI parallel data structures for tree-based particle methods.* As the lead CS developer of FleCSPH I focus on the binary, quad and octree topology with the parallelism and distributed aspects.

Amanzi/ATS *provides a flexible and extensible parallel flow and reactive transport simulation capability for environmental applications.* I focus on the portage of Amanzi from Etpetra to Tpetra and the conversion to Kokkos for portability on accelerators like GPGPUs.

Mentoring

2021 - present **Master's students for HPC.** *Research projects hosted at the University of Reims Champagne-Ardenne.*

2019 - present **Co-Lead of the ASC Co-Design Summer School at LANL.** *Mentoring four to six students with various backgrounds working on a co-design research project during ten weeks.*

Internships

November 2016 - 2017 ◦ **Student Volunteer at SC16 and SC17 Conference.**
Salt Lake City, Utah, USA and Denver, Colorado, USA.

Summer 2017 ◦ **SPH Methods Optimization.**
B. Bergen, C. Junghans. Los Alamos National Laboratory. Los Alamos, New-Mexico, USA.

Summer 2016 ◦ **Co-Design Summer School.**
C. Junghans, B. Bergen, Allen McPherson. Los Alamos National Laboratory..

Skills

HPC Unix, Bash, **cmake**, **C/C++**, **CUDA**, **OpenMP**, **MPI** and **Kokkos**..

Languages **English**: full professional proficiency. **French**: native speaker.

Publications

Journal Article

- **FleCSPH: The Next Generation FleCSIble Parallel Computational Infrastructure for Smoothed Particle Hydrodynamics**
  J. Loiseau, H. Lim, M. A. Kaltenborn, O. Korobkin, C. M. Mauney, I. Sagert, W. Even, B. Bergen. SoftwareX journal Volume 12, July–December 2020.

- **Many-Core Approaches to Combinatorial Problems: case of the Langford problem.**
  M. Krajecki, J. Loiseau, F. Alin and C. Jaillet. Supercomputing Frontiers and Innovations 2016 Journal, Vol. 3, No. 2, pages 21-37.

Conference Proceedings

- **Conservation of Angular Momentum in the Fast Multipole Method.**
  O. Korobkin, H. Lim, I. Sagert, J. Loiseau, C. Mauney, M. A. R. Kaltenborn, BJ. Tsao, W. P. Even. In proceedings for SPHERIC 2021.

- **Modeling Neutron Star Oscillations in a Fixed General Relativistic Background Including Solid Crust Dynamics.**
  BJ. Tsao, I. Sagert, O. Korobkin, I. Tews, H. Lim, G. Dilts, J. Loiseau. In proceedings for SPHERIC 2021.

- **FleCSPH: a Parallel and Distributed Smoothed Particle Hydrodynamics Framework Based on FleCSI.**
  J. Loiseau, H. Lim, B. K. Bergen, N. D. Moss, F. Alin. HPCS conference 2018, Orléans, France.

- **FleCSPHg: A GPU Accelerated Framework for Physics and Astrophysics Simulations.**
  J. Loiseau, F. Alin, C. Jaillet, and M. Krajecki. Latin America HPC Conference, September 23th – 28th 2018.

- **BFS Traversal on Multi-GPU Cluster.**
  M. Krajecki, J. Loiseau, F. Alin and C. Jaillet. International Symposium on Distributed Computing and Applications to Business, Engineering and Science (DCABES) 24-26 Août 2016 Paris, FRANCE.

- **Towards the Parallel Resolution of the Langford Problem on a Cluster of GPU Devices.**
  H. Deleau, C. Jaillet, M. Krajecki, J. Loiseau, L.-A. Steffenel, F. Alin. CSC14: The Sixth SIAM Workshop on Combinatorial Scientific Computing. July 21-23 2014, Lyon, France.

Invited Conference

- **Many-Core Approaches to solve Combinatorial Problems.**
  M. Krajecki, J. Loiseau, C. Jaillet and F. Alin. Supercomputing Frontiers 2016, Singapour, mars 2016.

Posters

- **FleCSPH: a Parallel and Distributed Smoothed Particle Hydrodynamics Framework Based on FleCSI.**
  J. Loiseau, H. Lim, B. Bergen, N. Moss, SuperComputing 2017, Denver CO.

- **Domain Partitioning and Problem Space Representations for Compact Binary Mergers.**
  N. de Brye, D. George, G. Hordemann, H. Lim, J. Loiseau, J. Miller, J. Sharman 2016 Co-Design Summer School, Los Alamos.

- **Massively Parallel Resolution of Combinatorial Problems on MultiGPU Clusters.**
  J. Loiseau, Ch. Jaillet, F. Alin and M. Krajecki. GTC Technology Conference 2015. March 2015, San Jose, USA.

Talks

- **GRAPH500: From Kepler to Pascal.**
  GPU Technology Conference 2017, Silicon Valley, May 8-11 2017.

- **Parcours de grands graphes sur architecture hybride CPU/GPU.**
  MARAMI and JFGG conference, October 14-16 2015, Nîmes, France.

- **Solving combinatorial problems on large multiGPU clusters: Breaking the challenge of the Langford problem.**
  ROMEO supercomputing day. June 2014 and 2015, URCA Reims France.