Valentin HONORÉ

PERSONAL DATA

PLACE AND DATE OF BIRTH :	Berck-Sur-Mer, France | 11 10 1991
ADDRESS :	56 avenue Voltaire
	33160 Saint Médard en Jalles, France
EMAIL :	valentin.honore@cc.in2p3.fr
WEBPAGE :	https ://cclab.pages.in2p3.fr/valentin.honore/

WORK EXPERIENCE

NOV 2020 - CURRENT	*Post-doctoral fellow* in the CC-IN2P3 (USR6402), CNRS, Villeurbanne, France, under the direction of Frédéric SUTER.
JUL 2018 - AUG 2018	*Visiting Scholar* VANDERBILT UNIVERSITY, Nashville TN, USA
	Two-month visit in the group of Pr. Padma RAGHAVAN to work on scheduling algorithms for stochastic applications.
NOV 2017 - OCT 2020	*PhD Student* in the UNIVERSITÉ DE BORDEAUX, France, in the TADaaM team of Inria Bordeaux Sud-Ouest, member of the LaBRI. *Teaching Assistant* in ENSEIRB-MATMECA engineering school.
FEB 2017 - JUN 2017	*Master 2 Internship* in ECO Team of LIRMM, Montpellier, France
	Study of the Scalar Multiplication for ECM Algorithm on Elliptic Curves. (report in french, slides in french)
	Advisors : Dr. Laurent IMBERT and Dr. Cyril BOUVIER
OCT 2015 - JUL 2016	*Special Visiting Student* in JAIST, Japan
	Bilateral exchange in CHONG Laboratory, JAIST. Working on developing simultaneous localization and map building algorithms. (report)
	Advisor : Prof. Nak-Young CHONG

EDUCATION

NOV 2017 - CURRENT	PhD Student at UNIVERSITÉ DE BORDEAUX, France
	Advisors : Dr. Brice GOGLIN and Dr. Guillaume PALLEZ
	Title : Managing the Diversity of Application Profiles on HPC Facilities
OCT 2015 - JUL 2016	Bilateral Exchange during 1st year of Master in JAIST, Nomi-shi, Japan
SEP 2014 - JUN 2017	Bachelor & Master of Science, ÉCOLE NORMALE SUPÉRIEURE DE LYON, France
SEP 2011 - JUN 2014	Bachelor of Science, UNIVERSITÉ MONTPELLIER 2, France

PHD THESIS

Title : HPC - Big Data Convergence : Managing Various Application Profiles on HPC Facilities

Summary : This thesis focuses on scheduling and resource partitioning problems for different profiles of applications that are executed on supercomputers. With the convergence between HPC and *Big Data*, new applications have emerged on HPC infrastructures. While typical HPC applications have the structure of a monolithic blocks of code, emerging applications express different structure by using *Machine Learning* frameworks. We propose to study two categories of applications targeting HPC infrastructures in order to better understand their needs in terms of computational resources and scheduling of their tasks.

Typical HPC applications, called data-intensive applications, compose the first category of interest of the thesis. They can be divided into two main phases. The first one is called simulation, a very compute-intensive code that generates a tremendous amount of data by simulating a physical or biological phenomena. The second component is called analytics, where sub-routines post-process the data of simulation to extract, generate and save the final result of the application. We propose to optimize these applications on supercomputers by designing automatic resource partitioning and scheduling strategies for the two components. To do so, we use the well-known *in situ* paradigm that consists in coupling both components together to reduce the huge cost of saving all simulation data on disks. While most of related works propose software solutions for *in situ* processing, we propose to include into these solutions automatic resource partitioning models and scheduling heuristics to improve overall performance of *in situ* applications.

The second category of applications, named stochastic applications, are applications for which execution time depends on its input, while in usual data-intensive applications the makespan of simulation and analytics are not affected by parameters. Stochastic jobs originate from *Big Data* or *Machine Learning* workloads, whose performance is widely dependent on characteristics of input data. Due to the increase of computational needs to train their internal models, these applications have recently appeared on HPC platforms. However, the uncertainty of their execution time remains a strong limitation when using supercomputers with batch schedulers. Indeed, the user has to guess a first reservation value. If the job does not complete successfully within this first reservation, the user will have to resubmit the job, this time asking for a longer reservation. At the end, the total cost to the user will be the cost associated with all the reservations that were necessary to the successful completion of the job. In this thesis, we propose to model the execution time of such applications by a probability distribution and use this knowledge to derive an optimal sequence of reservations that minimize the expectation of the execution time. We also derive strategies including checkpointing at the end of some (well-chosen) reservations, to avoid wasting the benefits of failed reservations. We also provide a full profiling of such emerging applications and show that they can be divided into sequential tasks, each having proper walltime distribution and memory peak. This knowledge can help users to derive cost-efficient reservation strategies.

LANGUAGES

FRENCH :	Mothertongue
ENGLISH :	Fluent
GERMAN, VIETNAMESE :	Basic Knowledge

PhD Thesis

[1]   Valentin HONORÉ. « HPC - Big Data Convergence : Managing the Diversity of Application Profiles on HPC Facilities ». Accès en ligne. Thèse de doctorat. Université de Bordeaux, 2020.

International journals with selection committee

[1]   Guillaume AUPY, Brice GOGLIN, Valentin HONORÉ et Bruno RAFFIN. « Modeling High-throughput Applications for in situ Analytics ». In : *International Journal of High Performance Computing Applications* 33.6 (2019), p. 1185-1200. DOI : 10.1177/1094342019847263.

[2]   Ana GAINARU, Brice GOGLIN, Valentin HONORÉ et Guillaume PALLEZ. « Profiles of upcoming HPC Applications and their Impact on Reservation Strategies ». In : *IEEE Transactions on Parallel and Distributed Systems* (2020). DOI : 10.1109/TPDS.2020.3039728.

Internation conferences with selection committee

[1]   Kshitij TIWARI, Valentin HONORÉ, Sungmoon JEONG, Nak Young CHONG et Marc Peter DEISENROTH. « Resource-constrained decentralized active sensing for multi-robot systems using distributed Gaussian processes ». In : *2016 16th International Conference on Control, Automation and Systems (ICCAS)*. Oct. 2016, p. 13-18. DOI : 10.1109/ICCAS.2016.7832293.

[2]   Guillaume AUPY, Ana GAINARU, Valentin HONORÉ, Padma RAGHAVAN, Yves ROBERT et Hongyang SUN. « Reservation Strategies for Stochastic Jobs ». In : *IPDPS 2019 - 33rd IEEE International Parallel and Distributed Processing Symposium*. Rio de Janeiro, Brésil : IEEE, mai 2019, p. 166-175. DOI : 10.1109/IPDPS.2019.00027.

[3]   Ana GAINARU, Brice GOGLIN, Valentin HONORÉ, Guillaume PALLEZ, Padma RAGHAVAN, Yves ROBERT et Hongyang SUN. « Reservation and Checkpointing Strategies for Stochastic Jobs ». In : *IPDPS 2020 - 34th IEEE International Parallel and Distributed Processing Symposium*. La Nouvelle Orléans, USA, mai 2020. DOI : 10.1109/IPDPS47924.2020.00092.

National conference without proceedings

[1]   Valentin HONORÉ. « Techniques d'ordonnancement pour les applications stochastiques sur plateformes HPC ». In : *COMPAS 2020 - Conférence francophone d'informatique en Parallélisme, Architecture et Système*. Lyon, France, juin 2020.

Research Reports

[1]   Guillaume AUPY, Ana GAINARU, Valentin HONORÉ, Padma RAGHAVAN, Yves ROBERT et Hongyang SUN. « Reservation Strategies for Stochastic Jobs (Extended Version) ». *Rapport de Recherche* 9211. Inria & Labri, Univ. Bordeaux; Department of EECS, Vanderbilt University, Nashville, TN, USA; Laboratoire LIP, ENS Lyon & University of Tennessee Knoxville, Lyon, France, oct. 2018, p. 1-37.

[2]   Ana GAINARU, Brice GOGLIN, Valentin HONORÉ, Guillaume PALLEZ, Padma RAGHAVAN, Yves ROBERT et Hongyang SUN. « Reservation and Checkpointing Strategies for Stochastic Jobs (Extended Version) ». *Rapport de Recherche* 9294. Inria & Labri, Univ. Bordeaux; Department of EECS, Vanderbilt University, Nashville, TN, USA; Laboratoire LIP, ENS Lyon & University of Tennessee Knoxville, Lyon, France, oct. 2019.

[3]   Ana GAINARU, Brice GOGLIN, Valentin HONORÉ et Guillaume PALLEZ. « Profiles of upcoming HPC Applications and their Impact on Reservation Strategies ». *Rapport de Recherche* 9359. Inria & Labri, Université Bordeaux, août 2020, p. 30.

Posters

[1]   Valentin HONORÉ, Brice GOGLIN, Guillaume AUPY et Bruno RAFFIN. « Modeling HPC applications for in situ Analytics ». *IPDPS 2019 - 33rd IEEE International Parallel and Distributed Processing Symposium*. Accès en ligne. Présenté par V. Honoré.

COLLECTIVE RESPONSIBILITIES

Program Committee
— HiPC 2021 (Software Track)
— ICPP 2021 (Algorithm Track)

Journal
— Reviewer for Journal of Parallel and Distributed Computing journal

OTHER ACTIVITIES

Inria "Early-Career" Ambassador for the Joint Laboratory for Extreme Scale Computing
Student Representative at Doctorate School Council