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RESEARCH SCIENTIST AT INRIA STORM TEAM

RESEARCH INTERESTS

High Performance Computing, Debugging, Verification, Optimisation, Static/dynamic Analysis

RESEARCH POSITIONS

- | | |
|-------------|---|
| Since 2017 | Tenured Research Scientist (CRCN)
<i>Inria Bordeaux (STORM team), France</i> |
| 2016 – 2017 | Postdoc in parallel computing with Jean-François Méhaut
<i>Optimisation of kernels with BOAST. European project HPC4E.</i>
<i>Inria Grenoble (CORSE team), France</i> |
| 2015 – 2016 | Postdoc in parallel computing with Koushik Sen, Costin Iancu and Wim Lavrijsen
<i>Development of dynamic analyses for speculative communication and synchronization optimizations in large scale scientific codes</i>
<i>University of California Berkeley – Lawrence Berkeley National Lab, Berkeley, USA</i> |

EDUCATION

- | | |
|-------------|---|
| 2012 – 2015 | PhD student in parallel computing
Defended on September 24, 2015 at the University of Bordeaux
<i>Static/dynamic analyses for validation and improvement of multi-models HPC applications launched on hybrid supercomputers with CPUs/GPUs clusters</i> Mentors: Denis Barthou and Patrick Carribault
<i>CEA - Université de Bordeaux, France</i> |
| | Ph.D Committee:
Fabrice RASTELLO (Research Associate First Class, Inria Grenoble, France)
Matthias MULLER (Professor in Computer Science, Université de Aachen, Allemagne)
Emmanuel JEANNOT (Senior Research Scientist, Inria Bordeaux, France)
Denis BARTHOU (Professor, Inria Bordeaux, France)
Patrick CARRIBAULT (Research Engineer, CEA, France)
Torsten HOEFFLER (Assistant Professor, ETH Zurich, Suisse) |
| 2010 – 2012 | Master degree in computer science, with distinction, <i>University of Versailles, France</i>
From concepts to systems (COSY), speciality: Modelisation, Optimisation and Decision (MODE) |
| 2008 – 2010 | Bachelor of science (Mathematics and computer science), <i>University of Paris Diderot, France</i> |
| 2006 – 2008 | Preparatory classes, <i>Lycée Saint Charles, Orléans, France</i>
"Spéciales" : Mathematics and Physics (MP)
"Supérieures" : Mathematics, Physics and industrial science (MPSI) |
| 2006 | High school diploma in science, with distinction, <i>Lycée Duhamel du Monceau, Pithiviers, France</i> |

Reviewed international conferences

- 2024 **MPI-BugBench: A Framework for Assessing MPI Correctness Tools**
Tim Jammer, Emmanuelle Saillard, Simon Schwitanski, Joachim Jenke, Radjasouria Vinayagame, Alexander Hück, and Christian Bischof. In Recent Advances in the Message Passing Interface: 31st European MPI Users' Group Meeting, EuroMPI 2024.
- 2024 **MPI Errors Detection using GNN Embedding and Vector Embedding over LLVM IR**
Jad El Karchi, Hanze Chen, Ali Tehrani, Ali Jannesari, Mihail Popov, and Emmanuelle Saillard. 2024 IEEE International Parallel and Distributed Processing Symposium (IPDPS), IEEE, 2024, pp. 595–607.
- 2022 **Learning Intermediate Representations using Graph Neural Networks for NUMA and Prefetchers Optimization.** Ali Tehrani, Mihail Popov, Akash Dutta, Emmanuelle Saillard, and Ali Jannesari. In 2022 IEEE International Parallel and Distributed Processing Symposium (IPDPS) (pp. 1206-1216).
- 2021 **Dynamic Data Race Detection for MPI-RMA Programs**
Tassadit Aitkaci, Marc Sergent, Emmanuelle Saillard, Denis Barthou and Guillaume Papaure. EuroMPI 2021.
- 2020 **Feasibility of whole-heart electrophysiological models with near-cellular resolution**
Mark Potse, Emmanuelle Saillard, Denis Barthou, Yves and Coudière. Computing in Cardiology, 2020 (supported by TGCC).
- 2019 **Multi-Valued Expression Analysis for Collective Checking**
Pierre Huchant, Denis Barthou, Emmanuelle Saillard and Patrick Carribault. In Euro-Par Conference, Lect. Notes in Computer Science, pages 29-43, 2019
- 2018 **Maximizing Communication Overlap with Dynamic Program Analysis**
Emmanuelle Saillard, Koushik Sen, Wim Lavrijsen, and Costin Iancu. Proceedings of the International Conference on High Performance Computing in Asia-Pacific Region. HPC Asia, pages 1-11. **Best paper finalist**
- 2015 **MPI Thread-Level Checking for MPI+OpenMP Applications**
Emmanuelle Saillard, Patrick Carribault and Denis Barthou. In Euro-Par Conference, Lect. Notes in Computer Science, pages 31-42, 2015
- 2013 **Combining Static and Dynamic Validation of MPI Collective Communications**
Emmanuelle Saillard, Patrick Carribault and Denis Barthou. In Euro-MPI conference, pages 117-122, 2013.

Workshops

- 2024 **Static-Dynamic analysis for Performance and Accuracy of Data Race Detection in MPI One-Sided Programs**
Radjasouria Vinayagame, Van Man Nguyen, Marc Sergent, Samuel Thibault and Emmanuelle Saillard. ISC High Performance 2024 International Workshops (C3PO'24). pp 59–73, 2024.
- 2023 **Rethinking Data Race Detection in MPI-RMA Programs**
Radjasouria Vinayagame, Van Man Nguyen, Marc Sergent, Samuel Thibault, and Emmanuelle Saillard. In Workshops of The International Conference on High Performance Computing, Network, Storage, and Analysis (SC-W 2023), November 12–17, 2023, Denver, CO, USA. Correctness 2023.
- 2022 **Decentralized in-order execution of a sequential task-based code for shared-memory architectures**
Charly Castes, Emmanuel Agullo, Olivier Aumage, and Emmanuelle Saillard. HIPS 2022
- 2021 **The MPI BUGS INITIATIVE: a Framework for MPI Verification Tools Evaluation**
Mathieu Laurent, Emmanuelle Saillard, and Martin Quinson. 2021 IEEE/ACM 5th International Workshop on Software Correctness for HPC Applications (Correctness), St. Louis, MO, USA, 2021, pp. 1-9.
- 2020 **Automatic Code Motion to Extend MPI Nonblocking Overlap Window**
Van Man Nguyen, Emmanuelle Saillard, Julien Jaeger, Denis Barthou, and Patrick Carribault. C3PO'20 Workshop - First Workshop on Compiler-Assisted Correctness Checking and Performance Optimization for HPC, pp.43-54, 2020.
- 2020 **PARCOACH Extension for Static MPI Nonblocking and Persistent Communication Validation**
Van Man Nguyen, Emmanuelle Saillard, Julien Jaeger, Denis Barthou and Patrick Carribault. Correctness 2020: Fourth International Workshop on Software Correctness for HPC Applications, 2020.
- 2018 **PARCOACH Extension for a Full-Interprocedural Collectives Verification**
Pierre Huchant, Denis Barthou, Emmanuelle Saillard, Hugo Brunie, and Patrick Carribault. Correctness 2018: Second International Workshop on Software Correctness for HPC Applications, Dallas, Texas, USA, Nov. 12, 2018.

- 2016 **PARCOACH Extension for Hybrid Applications with Interprocedural Analysis**
Emmanuelle Saillard, Hugo Brunie, Patrick Carribault, and Denis Barthou. In Tools for High Performance Computing 2015: Proceedings of the 9th International Workshop on Parallel Tools for High Performance Computing, pages 135-146, 2016. **Invited paper**
- 2014 **Static Validation of Barriers and Worksharing Constructs in OpenMP Applications**
Emmanuelle Saillard, Patrick Carribault, and Denis Barthou. In Luiz DeRose, Bronis R. de Supinski, Stephen L. Olivier, Barbara M. Chapman, and Matthias S. Muller, editors. Proc. Intl. Workshop on OpenMP IWOMP, volume 8766 of Lect. Notes in Computer Science, pages 73-86, 2014

International journals

- 2023 **Optimizing Performance and Energy Across Problem Sizes Through a Search Space Exploration and Machine Learning**
Mihail Popov, Lana Scravaglieri, Laércio Lima Pilla, Amina Guermouche, Olivier Aumage, and Emmanuelle Saillard. J. Parallel Distrib. Comput. 180, C (Oct 2023).
- 2022 **MPI Detach - Towards Automatic Asynchronous Local Completion**
Joachim Protze, Marc-Andre Hermanns, Matthias S. Muller, Van Man Nguyen, Julien Jaeger, Emmanuelle Saillard, Patrick Carribault, and Denis Barthou. Parallel Computing, Volume 109, 2022
- 2014 **PARCOACH: Combining Static and Dynamic Validation of MPI Collective Communications**
Emmanuelle Saillard, Patrick Carribault, and Denis Barthou. Intl. Journal on High Performance Computing Applications IJHPCA,28(4):425-434

Other international publications (posters, short papers)

- 2024 **Designing Quality MPI Correctness Benchmarks: Insights and Metrics**
Tim Jammer, Simon Schwitanski, Emmanuelle Saillard, Alexander Hueck, Joachim Jenke, Radjasouria Vinayagame, Christian Bischof, HPC Bugs Fest 2024. In Workshops of The International Conference on High Performance Computing, Network, Storage, and Analysis (SC-W 2024), November 17–22, 2024, Atlanta, GA, USA.
- 2023 **Highlighting PARCOACH Improvements on MBI**
Philippe Virouveau, Emmanuelle Saillard, Marc Sergent, and Pierre Lemarinier. HPC Bugs Fest 2023. In Workshops of The International Conference on High Performance Computing, Network, Storage, and Analysis (SC-W 2023), November 12–17, 2023, Denver, CO, USA.
- 2015 **Static/Dynamic Validation of MPI Collective Communications in Multi-Threaded Context**
Emmanuelle Saillard, Patrick Carribault and Denis Barthou. In ACM SIGPLAN Symp. on Principles and Practice of Parallel Programming (PPoPP), pages 279-280. 2015. **Poster session.**
- 2015 **Correctness Analysis of MPI-3 Non-Blocking Communications in PARCOACH**
Julien Jaeger, Emmanuelle Saillard, Patrick Carribault and Denis Barthou. In Euro-MPI conference, pages 16:1-16:2, 2015

TEACHING

UVSQ-CENTRALE

- MASTER 2 MIHPS **Advanced Compilation: addition of a profiling pass in GCC (Teacher assistant)**
Teacher: Patrick Carribault (CEA)
Years: 2015 - 6HeqTD
- MASTER 1 MIHPS **C Programming and UNIX Environment (Teacher assistant)**
Teacher: Marc Perache (CEA)
Années: 2013,2014 - 9HeqTD
Parallel Optimization Techniques (Teacher assistant)
Teacher: Marc Perache (CEA)
Years: 2014, 2015 - 9HeqTD

UNIV. GRENOBLE-ALPES

- MASTER 1 MOSIG **Parallel Algorithms and programming (Teacher assistant)**
Teacher: Frederic Desprez (Inria Grenoble)
Years: 2017 - 9HeqTD

INP GRENOBLE

- 1ST YEAR PEiP C **Initiation to C programming (Teacher)**
Years: 2017 - **Volume:** 12h - **Type:** Cours+TP

ENSEIRB-MATMECA

1ST YEAR

Tree structures (Teacher)

Years: 2017, 2018, 2019, 2020, 2021 - 20HeqTD

Initiation of algorithm (Teacher)

Years: 2018, 2019, 2020, 2021 - 20HeqTD

3RD YEAR

Languages of parallelism (Teacher)

Years: 2019, 2020, 2021, 2022, 2023, 2024 - 14HeqTD

UNIVERSITY OF BORDEAUX

3RD YEAR

Introduction to research (Teacher)

Years: 2021,2022 - 1HeqTD

OTHER

EuroMPI tutorial

Hands-On Using PARCOACH, Bristol, 2023 ([link](#))

Doctoral training

Initiation à la médiation scientifique, Inria, 2023, 2024

EJCP Summer school

Static/dynamic analysis of HPC applications ([link](#))

SUPERVISION

Internships

- 2024 Co-supervisor of Asia Auville (M2 @ Bordeaux INP, 6 month), Inria
- 2023 Co-supervisor of Jad El Karchi (M1 @ Bordeaux INP, 3 month), Inria
- 2022 Pierre-Antoine Rouby (M2 @ University of Bordeaux, 6 month), Inria
- 2021 Supervisor of Pierre-Antoine Rouby (M1 @ University of Bordeaux, 2 month), Inria
- Co-supervisor of Charly Castes (M2 @ Ecole Polytechnique, 6 month), Inria
- Co-supervisor of Mathieu Laurent (M1 @ ENS Rennes, 6 month), Inria
- 2020 Supervisor of Vincent Bridonneau (M2 @ Bordeaux INP, 6 month), U. Bordeaux
- Supervisor of Radjasouria Vinayagame (L3 @ Bordeaux INP, 1,5 month), Inria
- 2019 Supervisor of Louise MERCIER (High school student, 2 weeks), Inria
- Supervisor of Firmin Martin (L3 @ ENS Lyon, 1,5 month), Inria
- 2018 Supervisor of Antoine Tirel (M1 @ Bordeaux INP, 3 month), Inria
- 2017 Co-supervisor of Ahmed Amine Nassik (M1 @ Polytech Grenoble, 3 month), Inria
- 2015 Co-supervisor of Hugo Brunie (M2 @ Bordeaux INP, 6 month), CEA
- 2014 Co-supervisor of Arthur Loussert (M1 @UVSQ, 2 month), CEA

PhD Students

- 2024- Co-advisor of Asia Auville, U. Bordeaux with M. Popov, E. Petit and P. Oliveira
Large Language Models for Detection and Correction of Errors in HPC Applications
- 2022- Co-advisor of Radjasouria Vinayagame, U. Bordeaux & Eviden with VM. Nguyen and S. Thibault
Performance and portability optimisation of HPC applications using PGAS models
- 2019-2022 Co-supervisor of Van Man Nguyen, U. Bordeaux & CEA with J. Jaeger, P. Carribault and D. Barthou
Compile-time Validation and Optimization of MPI Nonblocking Communications
- 2019-2022 Co-supervisor of Tassadit Celia Ait Kaci, U. Bordeaux & Eviden with M. Sergent and D. Barthou
Analysis and optimizations for partitioned global address space based HPC applications

Post-doctoral Fellows

- 2019-2020 Co-supervisor of Pierre Huchant (DPEI Inria@SiliconValley), LBNL

Engineer

- 2021-2022 Co-supervisor of Chiheb Sakka, Inria (Exacard Project)
- 2022-2023 Supervisor of Philippe Virouveau, Inria & Eviden (Plan de relance Inria-Eviden)

INVITED TALK

- *Latest Advancements in PARACOACH for MPI Code Verification* IPTW 2023, online
- *Vérification des applications MPI par une analyse statique/dynamique*
National days GDR GPL, Grenoble June 12-15, 2018
- *PARCOACH Extension for Hybrid Applications with Interprocedural Analysis*
9th International Workshop on Parallel Tools, Dresden September 2015

GRANTS AND PROJECTS

2024 - 2027	Inria's Exploratory Action: LLM4DiCE (scientific leader, 129 k€)
2022 - 2025	Plan de relance with Eviden, <i>Vérifications des applications MPI-RMA</i> (PI, 72k€)
2022 - 2025	Plan de relance with Eviden, <i>Méthodes pour l'analyse des pannes reposant sur des techniques de types statistical learning</i> (coPI, 47k€)
2021 - 2024	European Project MICROCARD (participant in WP2)
2018 - 2022	ANR EXACARD (participant)
2019 - 2021	Inria associate team COHPC (PI, 10k€/year)
2016 - 2020	IPL HAC-SPECIS (participant)

COLLECTIVE RESPONSIBILITIES

ORGANIZATIONAL	2024:	C3PO Workshop @ISC: general chair, Protocols @SC: co-Chair, HPC Bugs Fest @SC: general chair
	2023:	EuroMPI: publicity and web chair, publisher Chair, HPC Bugs Fest @SC: general chair
	2022:	SBACPAD: Local Arrangement Chair ICPP: Local Arrangement Chair
	2021:	C3PO Workshop @ISC: general chair, French compilation days: Chair, Compas: track chair
	2020:	C3PO Workshop @ISC: co-Chair
PROGRAM COMMITTEE	2025:	BoF @SC
	2024:	Cluster, Compas, Correctness workshop
	2023:	Compas, CC, Correctness workshop
	2022:	Compas, ICCS, Correctness workshop
	2021:	EuroPar, Correctness workshop, EuroMPI (Poster committee)
	2020:	SC (Performance), Correctness workshop
	2019:	Correctness workshop, PPAM, OMASE, 4PAD, Compas
PHD JURY	2018:	SC (Workshop), ISC HPC (Poster), Compas
	2024:	Richard Satory, Eviden (member) Tim Jammer, TU Darmstadt (reviewer)
	2023:	Andreas Thune, University of Oslo (reviewer) Amaury Maillé, ENS Lyon (guest)
	2021:	James Trotter, University of Oslo (reviewer)
	2020:	Jérémy Lagravière, University of Oslo (reviewer)
SELECTION COMMITTEE	2020:	Tao Chang, Institut Polytechnique de Paris (member)
	2024:	CRCN/ISFP selection committee for Inria Lyon Research Center
	2023:	Associate Professor selection committee for Bordeaux INP
	2022:	Associate Professor selection committee for Bordeaux INP, CRCN/ISFP selection committee for Inria Bordeaux Research Center
	2021:	Associate Professor selection committee for the university of Rennes
	2020:	Associate Professor selection committee for the university of Perpignan

INSTITUTIONAL RESPONSIBILITIES

Since 2021	In charge of the scientific mediation for the Inria Bordeaux - Sud-Ouest Research Center
Since 2018	Member of the Commission de délégation (delegation, postdoc, cordi-s)
2023	Responsible of a panel at the Inria scientific days (JSI)
2018-2023	Treasurer of the works council (AGOS) of the Inria Bordeaux - Sud-Ouest Research Center

OUTREACH ACTIVITIES

Since 2024	Member of the SIF (Société informatique de France) executive board
Since 2022	Member of the Blaise Pascal Fondation scientific board

Dissemination of scientific knowledge

- Since 2022, I co-organize MIMM (Moi Informaticienne - Moi Mathématicienne), a workshop for girls in high school ([link](#))
- *Ces super-ordinateurs peuvent éviter les arythmies cardiaques !*, video published by Curieux ([link](#))
- *À quoi servent les ordinateurs les plus puissants au monde ? Un exemple en cardiologie*, Emmanuelle Saillard and Mark Potse, The Conversation France, 2022 ([link to the article](#))
- Panel participation at the journée d'étude for the AlgoJ project ([link](#))
- Co-creation of the podcast *Désassemblons le numérique*
- Désassemblons le numérique, épisode 2: tous les chemins mènent au chocolat ([link to episode 2](#))
- Co-creation of *1 minute avec..* series
- *1 minute avec..* Emmanuelle Saillard ([Pixees article](#), [canal-u](#))
- Co-organization of a hackathon on algorithms with the Journalism Institute of Bordeaux Aquitaine (IJBA) ([link](#))
- The great wall of Egypt, an unplugged activity to introduce HPC ([Pixees article](#))