Emmanuelle SAILLARD

Nationality | french

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

Education

2012 – 2015	**PhD student in parallel computing**
	 Defended on September 24, 2015 at the University of Bordeaux
	 Static/dynamic analyses for validation and improvement of multi-models HPC applications launched on hybrid supercomputers with CPUs/GPUs clusters **Mentors:** Denis Barthou and Patrick Carribault
	 CEA - Université de Bordeaux, France
	
	 Ph.D Commitee:
	     Fabrice RASTELLO (Research Associate First Class, Inria Grenoble, Francee)
	     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**, *University of Versailles, France* From concepts to systems (COSY), speciality: Modelisation, Optimisation and Decision (MODE)
2008 – 2010	**Bachelor of science (Mathematics and computer science)**, *University of Paris Diderot, France*
2006 – 2008	**Preparatory classes**, *Lycée Saint Charles, Orléans, France* "Spéciales" : Mathematics and Physics (MP) "Supérieures" : Mathematics, Physics and industrial science (MPSI)
2006	**High school diploma in science, with distinction**, *Lycée Duhamel du Monceau, Pithiviers, France*

PUBLICATIONS

Reviewed international conferences

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.
IPDPS 2024. TO APPEAR

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   **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

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

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**.

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.
C3PO'24 Workshop. TO APPEAR

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.

2023   **Highlighting PARCOACH Improvements on MBI**
Philippe Virouleau, 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.

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

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

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 - 14HeqTD

University of Bordeaux

3rd year	**Introduction to research (Teacher)**
	Years: 2021,2022 - 1HeqTD

Supervision

Internships	[2024] Asia Auville (M2 student at ENSEIRB-MATMECA, 6 month),
	co-supervised with Mihail Popov
	[2023] Jad El Karchi (M1 student at ENSEIRB-MATMECA, 3 month),
	co-supervised with Mihail Popov
	[2022] Pierre-Antoine Rouby (M2 student at University of Bordeaux, 6 month)
	[2021] Pierre-Antoine Rouby (M1 student at University of Bordeaux, 2 month)
	[2021] Charly Castes (M2 student at Ecole Polytechnique, 6 month),
	co-supervised with Olivier Aumage and Emmanuel Agullo
	[2020-2021] Mathieu Laurent (M1 student at ENS Rennes, 6 month), co-supervised with M. Quinson
	[2020] Vincent Bridonneau (M2 student at ENSEIRB-MATMECA, 6 month)
	[2019-2020] Radjasouria Vinayagame (L3 student at ENSEIRB-MATMECA, 1,5 month)
	[2019] Louise MERCIER (High school student, 2 weeks)
	[2019] Firmin Martin (L3 student at ENS Lyon, 1,5 month)
	[2018] Antoine Tirel (M1 student at ENSEIRB-MATMECA, 3 month)
	[2017] Ahmed Amine Nassik (M1 student at Polytech Grenoble, 3 month),
	co-supervised with Jean-Francois Mehaut and Brice Videau
	[2015] Hugo Brunie (M2 student at ENSEIRB-MATMECA, 6 month),
	co-supervised with Patrick Carribault and Denis Barthou
	[2014] Arthur Loussert (M1 student at UVSQ, 2 month), co-supervised with Patrick Carribault
PhD	[2022-] Radjasouria Vinayagame, co-supervised with Van Man Nguyen and Samuel Thibault
	[2019-2022] Tassadit Celia Ait Kaci, co-supervised with Marc Sergent and Denis Barthou
	[2019-2022] Van Man Nguyen, co-supervised with Julien Jaeger, Patrick Carribault and Denis Barthou
Postdoc	[2019-2020] Pierre Huchant (DPEI Inria@SilliconValley), co-supervised with Costin Iancu
Engineer	[2021-2022] Chiheb Sakka, co-supervised with Denis Barthou (Exacard Project)

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

Collaborations / Projects

2024 - 2027	Inria's Exploratory Action: Large Language Models for Detection and Correction of Errors (scientific leader)
2022 - 2025	Plan de relance with Eviden (PI, 72k€):
2022 - 2025	Plan de relance with Eviden (coPI, 47k€):
2021 - 2024	European Project MICROCARD (participant in WP2)
2019 - 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, Protools @SC: co-Chair
	2023: EuroMPI: publicity and web chair, publisher Chair, HPC Bugs Fest @SC: general chair
	2022: SBACPAD: Local Arrangment Chair
	2022: ICPP: Local Arrangment Chair
	2021: C3PO Workshop @ISC: general chair, French compilation days: Chair, Compas: track chair
	2020: C3PO Workshop @ISC: co-Chair
Program Committee	**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
	2018: SC (Workshop), ISC HPC (Poster), Compas
PhD Jury	**2023:** Andreas Thune, University of Oslo (reviewer)
	2023: Amaury Maillé, ENS Lyon (guest)
	2021: James Trotter, University of Oslo (reviewer)
	2020: Jérémy Lagravière, University of Oslo (reviewer)
	2020: Tao Chang, Institut Polytechnique de Paris (member)
Selection Committee	**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

2023	Responsible of a panel at the Inria scientific days (JSI)
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)
2018-2023	Treasurer of the works council (AGOS) of the Inria Bordeaux - Sud-Ouest Research Center

Outreach Activities

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