

# Jean-Baptiste Besnard

MANAGER · TECHNICAL LEADER

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## Experience

### Manager and Technical Leader

PARATOOLS SAS

- Lead a team of consultants to timely meet their objectives
- Identify and conduct innovative R&D studies and developments
- Manage R&D projects with public fundings

*Bruyère-le-Châtel, France*

*Sept. 2016 - present*

### Teaching Module Lead

UNIVERSITÉ DE VERSAILLES SAINT-QUENTIN (UVSQ)

- Courses on Operating Systems internal architecture for M1 students

*Versailles, France*

*Jan. 2019 - Jun. 2019*

### High-Performance Computing (HPC) Consultant

PARATOOLS SAS

- System-level development in a thread-based MPI runtime, updated from 2.0 to 3.1 standard
- Development of an RDMA interface for Infiniband cards (libverbs)
- Development of a GCC compiler plugin promoting global variables to TLS

*Bruyère-le-Châtel, France*

*Aug. 2014 - Sept. 2016*

### Research Engineer

EXASCALE COMPUTING RESEARCH

- Develop innovative web-based interfaces for a profiling tool

*Versailles, France*

*Oct. 2013 - Aug. 2014*

### Teaching Assitant

INSTITUT DES SCIENCES ET TECHNIQUES DES YVELINES (ISTY)

- Processor architecture for second year engineering students

*Velizy, France*

*Oct. 2013 - Jul. 2014*

### Ph.D. Student

CEA, DAM, DIF

- Parallel profiling and tracing of massively parallel applications (MPI + OpenMP)

*Bruyères-le-Châtel, France*

*Oct. 2010 - Jul. 2013*

### Teaching Assistant

UNIVERSITÉ DE VERSAILLES SAINT-QUENTIN (UVSQ)

- Advanced compilation techniques (M2)

*Versailles, France*

*Oct. 2012 - Jul. 2013*

### Teaching Assistant

UNIVERSITÉ DE VERSAILLES SAINT-QUENTIN (UVSQ)

- C programming and UNIX environments (M1)
- Parallel optimization and profiling using MPI and OpenMP (M1)

*Versailles, France*

*Oct. 2011 - Jul. 2012*

## Skills

**Programming languages** C, Python, JavaScript (Node.js), Go, C++, Ba(sh)

**Parallelism abstractions** MPI, OpenMP, Pthread

**Communication layers** TCP, MPI, Infiniband, gRPC

**Management** Team lead, customer facing, budget management

**R&D** Research paper writing, funding application, standardization committee (MPI)

**Proficient languages** French (Native), English

# Projects

## Muti-Processor Computing

A THREAD-BASED UNIFIED IMPLEMENTATION OF MPI AND OPENMP

- Updated MPC from the Message Passing Interface standard (MPI) 2.0 to 3.1
- Developed the RDMA interface (Infiniband) in MPC
- Integrated MPI-IO inside MPC
- Added support for Fortran bindings
- Worked on collective communication algorithms
- Implemented a privatization plugin inside GCC

C, Fortran, MPI, OpenMP

[hpcframework.com/mpc/](http://hpcframework.com/mpc/)

## pcocc

PRIVATE CLOUD ON A COMPUTE CLUSTER

- Implement a Pod agent in GO and GRPC to run containers inside VMs
- Integrate rootless container support inside pcocc
- OCI image and bundle conversion and storage

Python, OCI, Docker, Go, gRPC

[github.com/cea-hpc/pcocc](https://github.com/cea-hpc/pcocc)

## Muti-Application Online Profiling

AN IN-SITU PROFILING TOOL FOR MPI APPLICATIONS

- Massive IO for tracing of MPI applications 100s of TB
- Instrumentation for MPI, OpenMP and Posix calls
- In-Situ processing using MPMD MPI
- Web-GUI using Node.JS for data-visualization

C, MPI, OpenMP, Node.js, HTML

[hpcframework.com/malp/](http://hpcframework.com/malp/)

# Education

## Ph.D. in Computer Science

CEA, DAM, DIF

- Profiling and debugging of massively parallel applications.

Bruyères-le-Châtel, France

Oct. 2010 - Sept. 2013

## Engineering Diploma

INSTITUT SUPÉRIEUR DE L'ÉLECTRONIQUE ET DU NUMÉRIQUE (ISEN)

- Specialization in Telecommunication and Networks.

Brest, France

Sept. 2007 - Jun. 2010

## Preparatory Mathematics Classes

INSTITUT SUPÉRIEUR DE L'ÉLECTRONIQUE ET DU NUMÉRIQUE (ISEN)

- Specialization in Telecommunication and Networks.

Brest, France

Sept. 2005 - Jun. 2007

# Publications

- J. Adam, J. Besnard, A. D. Malony, S. Shende, M. Pérache, P. Carribault, and J. Jaeger. Transparent high-speed network checkpoint/restart in MPI. In *Proceedings of the 25th European MPI Users' Group Meeting, Barcelona, Spain, September 23-26, 2018*, pages 12:1–12:11, 2018.
- J. Adam, M. Kermarquer, J. Besnard, L. Bautista-Gomez, M. Pérache, P. Carribault, J. Jaeger, A. D. Malony, and S. Shende. Checkpoint/restart approaches for a thread-based MPI runtime. *Parallel Computing*, 85:204–219, 2019.
- J. Besnard. *Profiling and debugging by efficient tracing of hybrid multi-threaded HPC applications. (Profilage et débogage par prise de traces efficaces d'applications hybrides multi-threadées HPC)*. PhD thesis, Versailles Saint-Quentin-en-Yvelines University, France, 2014.
- J. Besnard, J. Adam, S. Shende, M. Pérache, P. Carribault, and J. Jaeger. Introducing task-containers as an alternative to runtime-stacking. In *Proceedings of the 23rd European MPI Users' Group Meeting, EuroMPI 2016, Edinburgh, United Kingdom, September 25-28, 2016*, pages 51–63, 2016.
- J. Besnard, A. D. Malony, S. Shende, M. Pérache, P. Carribault, and J. Jaeger. An MPI halo-cell implementation for zero-copy abstraction. In *Proceedings of the 22nd European MPI Users' Group Meeting, EuroMPI 2015, Bordeaux, France, September 21-23, 2015*, pages 3:1–3:9, 2015.
- J. Besnard, A. D. Malony, S. Shende, M. Pérache, P. Carribault, and J. Jaeger. Towards a better expressiveness of the speedup metric in MPI context. In *46th International Conference on Parallel Processing Workshops, ICPP Workshops 2017, Bristol, United Kingdom, August 14-17, 2017*, pages 251–260, 2017.
- J. Besnard, M. Pérache, and W. Jalby. Event streaming for online performance measurements reduction. In *42nd International Conference on Parallel Processing, ICPP 2013, Lyon, France, October 1-4, 2013*, pages 985–994, 2013.
- J.-B. Besnard, A. D. Malony, S. Shende, M. Pérache, P. Carribault, and J. Jaeger. Unifying the analysis of performance event streams at the consumer interface level. In C. Niethammer, M. M. Resch, W. E. Nagel, H. Brunst, and H. Mix, editors, *Tools for High Performance Computing 2017*, pages 57–71, Cham, 2019. Springer International Publishing.
- J.-B. Besnard, A. D. Malony, S. Shende, M. Pérache, and J. Jaeger. Gleaming the cube: Online performance analysis and visualization using malp. In A. Knüpfer, T. Hilbrich, C. Niethammer, J. Gracia, W. E. Nagel, and M. M. Resch, editors, *Tools for High Performance Computing 2015*, pages 53–66, Cham, 2016. Springer International Publishing.
- A. Capra, P. Carribault, J. Besnard, A. D. Malony, M. Pérache, and J. Jaeger. User co-scheduling for mpi+openmp applications using openmp semantics. In *Scaling OpenMP for Exascale Performance and Portability - 13th International Workshop on OpenMP, IWOMP 2017, Stony Brook, NY, USA, September 20-22, 2017, Proceedings*, pages 203–216, 2017.

## Program Committees

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2019	<b>Reviewer</b> , Workshop on Monitoring and Analysis for High Performance Computing Systems Plus Applications 2017 (HPCMaspa 2019)	<i>Workshop</i>
2019	<b>Reviewer (Performance Modeling and Evaluation track)</b> , 18th IEEE/ACM International Conference on Cluster, Cloud, and Grid Computing (CCGrid 2019)	<i>Conference</i>
2018	<b>Reviewer</b> , 7th Workshop on Extreme-Scale Programming Tools	<i>Workshop</i>
2018	<b>Reviewer (Posters)</b> , EuroMPI 2018	<i>Conference</i>
2018	<b>Reviewer (Performance Track)</b> , International Conference on Parallel Processing (ICPP)	<i>Conference</i>
2018	<b>Reviewer (Performance Modeling and Evaluation track)</b> , 18th IEEE/ACM International Conference on Cluster, Cloud, and Grid Computing (CCGrid 2018)	<i>Conference</i>
2017	<b>Reviewer</b> , Workshop on Monitoring and Analysis for High Performance Computing Systems Plus Applications 2017 (HPCMaspa 2017)	<i>Workshop</i>
2017	<b>Reviewer</b> , 6th Workshop on Extreme-Scale Programming Tools	<i>Workshop</i>
2017	<b>Reviewer</b> , Future Generation Computer Systems 2017	<i>Journal</i>
2017	<b>Reviewer (Posters)</b> , EuroMPI/USA 2017	<i>Conference</i>
2017	<b>Reviewer (Performance Measurement, Modelling, and Tools)</b> , The International Conference for High Performance Computing, Networking, Storage, and Analysis, SC 2017	<i>Conference</i>
2016	<b>Reviewer (Performance Measurement, Modelling, and Tools)</b> , The International Conference for High Performance Computing, Networking, Storage, and Analysis, SC 2016	<i>Conference</i>
2016	<b>Reviewer</b> , Workshop on Monitoring and Analysis for High Performance Computing Systems Plus Applications 2016 (HPCMaspa 2016)	<i>Conference</i>