Xinzhe Wu

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Github: `https://github.com/brunowu`

Personal Profile

A Computer Science Ph.D. student in High Performance Computing (HPC) and numerical algebra algorithms, smart working, reliable with good technical and communication skills. Always willing to learn, a good eye for details, happy to work both independently and as a part of a team.

Objective

Apply for the post-doctoral position.

I will be available after the defense of my PhD thesis in March 2019. Enough research work is done for my thesis, and the graduation on time is agreed by my supervisor.

Current Research Domains

Numerical Algebra Algorithms: Non-Hermitian linear systems and eigenvalue problems, Krylov methods, parallel solvers and preconditioners, parallel sparse matrix optimization

HPC: Parallel Programming, Scientific Computing, Computer Architecture

Education

University Lille 1 of Sciences and Technologies *Apr. 2016 - present, Lille, France*
Ph.D. in Computer Science & High Performance Computing
CRISTAL - Centre de Recherche en Informatique, Signal et Automatique de Lille
Advisor: Serge G. Petiton

Ecole Centrale de Lille *Sep. 2014 - Jun. 2015, Lille, France*
International exchange in Complex Systems Engineering.

Beihang University *Sep. 2013 - Jan. 2016, Beijing, China*
M.S. in Control Engineering
Ecole Centrale de Pékin
Advisor: Bohu Li

Beihang University *Sep. 2009 - Jun. 2013, Beijing, China*
B.S. in Mathematics and Applied Mathematics

Professional Experience

Maison de la Simulation, CNRS USR3441. - Ph.D. Student *Apr. 2016 - now*
· Subject: Contribution to the Emergence of New Intelligent Distributed and Parallel Methods using a Multilevel Programming Paradigm for Extreme Computing
· Funded by ANR-DFG-JST project MYX.

Intern instructor *Jul. 2018 - Aug. 2018*
· Experimentation and development of an interface for software generating a non-Hermitian matrix from a given spectrum.

· Internship Student: Quentin Petit, a student of Polytech Lille.
· Finance of Internship: MYX project.

Intern Co-instructor *May. 2017 - Sept. 2017*

· Experiments, evaluations, and improvements of scientific library elements for GPU or intel accelerator clusters to optimize distributed and parallel software implementing the GMRES-ERAM / LS method.
· Internship Student: Tao CHANG, a master student of Ecole Centrale de Nantes.
· Finance of Internship: CEA.

Biomouv, Paris. - Data Analyst (Internship) *Apr. 2015 - Sept. 2015*

· Analyse the medical data by various traditional machine learning methods

Peer-reviewed Publications

· Xinzhe Wu and Serge G. Petiton, "A Distributed and Parallel Asynchronous Unite and Conquer Method to Solve Large Scale Non-Hermitian Linear Systems" in HPC Asia 2018: International Conference on High Performance Computing in Asia-Pacific Region, Tokyo, Japan. [Full paper]

· Xinzhe Wu, Serge G. Petiton and Yutong Lu, "A Parallel Generator of Non-Hermitian Matrices computed from Given Spectra" in VECPAR 2018: 13th International Meeting on High Performance Computing for Computational Science, São Pedro, Brazil. [Full paper]

· Xinzhe Wu and Serge G. Petiton, "A Distributed and Parallel Unite and Conquer Method to Solve Sequences of Non-Hermitian Linear Systems". Submitted to Japan Journal of Industrial and Applied Mathematics. [Under Review]

Contributed and Invited Talks

· Xinzhe Wu, Serge G. Petiton and Yutong Lu, "A Parallel Generator of Non-Hermitian Matrices Computed from Given Spectra" in VECPAR 18: 113th International Meeting on High Performance Computing for Computational Science, São Pedro, Brazil. [pdf]
· Xinzhe Wu and Serge G. Petiton, "A Parallel Generator of Non-Hermitian Matrices Computed from Given Spectra" in PMAA18: 10th International Workshop on Parallel Matrix Algorithms and Applications, Zurich, Switzerland. [pdf]
· Xinzhe Wu and Serge G. Petiton, "A Parallel Generator of Non-Hermitian Matrices Computed from Known Given Spectra" in 3rd Workshop on Parallel Programming Models - Productivity and Applications, Aachen, Germany. [pdf]
· Xinzhe Wu and Serge G. Petiton, "A Parallel Generator of Non-Hermitian Matrices Computed from Known Given Spectra" in SIAM PP18: SIAM Conference on Parallel Processing for Scientific Computing, Tokyo, Japan. [pdf]
· Serge G. Petiton and Xinzhe Wu, "The Unite and Conquer GMRES-LS/ERAM method to solve sequences of Linear Systems" in EPASA 2018: International Workshop on Eigenvalue Problems: Algorithms, Software and Applications, in Petascale Computing, Tsukuba, Japan.
· Xinzhe Wu and Serge G. Petiton, "A Distributed and Parallel Asynchronous Unite and Conquer Method to Solve Large Scale Non-Hermitian Linear Systems" in HPC Asia 2017: International Conference on High Performance Computing in Asia-Pacific Region, Tokyo, Japan. [pdf]
· Serge G. Petiton, Xinzhe Wu and Tao Chang, "A Distributed and Parallel Asynchronous Unite and Conquer Method to Solve Large Scale Non-Hermitian Linear Systems" in Preconditioning 2017: International Conference On Preconditioning Techniques For Scientific And Industrial Applications, Vancouver, Canada. [pdf]

Technical Reports

· Xinzhe Wu, "SMG2S Manual" in Maison de la Simulation, France - Version 1.0, 2018. [pdf]

Posters

· Xinzhe Wu and Serge G. Petiton, "Large Non-Hermitian Matrix Generation with Given Spectra" in EPASA 2018: International Workshop on Eigenvalue Problems: Algorithms, Software and Applications, in Petascale Computing, Tsukuba, Japan. [pdf]

Softwares

SMG2S: Scalable Matrix Generator with Given Spectrum

· SMG2S is a software implemented based on C++/MPI which aims to evaluate and benchmark the iterative solvers for eigenvalue and linear system solvers on supercomputers. SMG2S is able to generate large sparse non-Hermitian matrices in parallel with good scalability using prescribed eigenvalues/spectral distribution. The interfaces to C, Python and the parallel scientific computing libraries such as PETSc/SLEPc and Trilinos are provided.

· Download stable version: SMG2S-1.0.0.zip

· Recent developing version is available on Github

UCGLE: Unite and Conquer GMRES/LS-ERAM method

· UCGLE is an implementation of a distributed and parallel method based on C/MPI and PETSc to solve very large non-Hermitian linear systems in large-scale homogenous and heterogeneous clusters. It uses the static MPI communicator to support the asynchronous communication.

· Codes are available on Github

UCMGLE: Unite and Conquer Multiple GMRES/LS-ERAM method

· UCMGLE is a special version UCGLE based on C++/MPI, Trilinos/Belos and Trilinos/Anasazi to solve very large non-Hermitian linear systems in large-scale homogenous and heterogeneous clusters. The dynamic allocation of the process using MPI_SPAWN allows multiple GMRES and ERAM computational components. Multiple GMRES allows solving simultaneously non-Hermitian linear systems with multiple right-hand sides using the Least Squares Polynomial preconditioning. It is comparable with deflated Block GMRES, but with less global communication and synchronization points.

· Codes are available on Github

Krylov_XMP

· Basic Krylov methods (GMRES and ERAM) implementation in XcalableMP. This work has collaborated with Tao Chang during his internship.

· Codes are available on Github

Projects

IMPACT Project - Ecole Centrale de Lille

Genetic Algorithm ⋄ Tabu Algorithm ⋄ Matlab

Study of different methods to solve the problem of Cross-dock door Assignment.

Collective Inovation Project - Ecole Centrale de Pékin

Optimization of the algorithm based on Radon space transformation

Optimization of multitouch algorithms for infrared touch screens based on the transformation space.

Master Thesis - Beihang University

Simulation ⋄ Multi-Agent

Modeling and Simulation of Supply Chain Emergence Mechanism Based on Multi-Agent.

Bachelor Project - Beihang University

Hadoop ◇ Search Engine ◇ Java ◇ ElasticSearch
Design and Implementation of a semantic distributed search engine based on Hadoop.

Achievements and Awards

Admission to 2017 International HPC Summer School (IHPCSS)

· In Juin 2017, 80 selected attendees out of 351 applicants from European, Japanese, Canadian and U.S. institutions, one-week courses and challenge about High Performance Computing techniques in the University of Colorado, Boulder, USA. Traveling and lodging are sponsored by HPC organizations and projects including XSEDE(US), PRACE(EU), RIKEN(JP) and Compute Calcul Canada.

2009 National Higher Education Entrance Examination of China

· Top 100 in Shanxi Province among 360,000 students.

Technical Skills

· Programming Language and Framework: C, C++, Python, MPI, OpenMP, CUDA, OpenAcc, MATLAB, Java, Latex, XcalableMP, YvetteML, R.
· Computational/Machine Learning Package: PETSc, SLEPc, Trilinos, Kokkos, BLAS, ScaLAPACK, CuSPARSE, TensorFlow, Scikit-learn, Hadoop.
· Others: bash, cmake, automake.

Languages

· English: Professional competence
· French: Professional competence
· Chinese: Native Language

Disclaimer

I hereby claim that is correct up to my knowledge.

References

Serge G. Petiton - Professor

· University Lille 1, Sciences and Technologies
· CNRS/CRIStAL, CNRS/Maison de la Simulation@Saclay
· Email: serge.petiton@univ-lille1.fr