SPARCITY

NEWSLETTER

Issue 1 | September 2022

KOÇ UNIVERSITY · Sabancı Üniversitesi · inesc id lisboa · [simula . research laboratory] · LMU LUDWIG-MAXIMILIANS-UNIVERSITÄT MÜNCHEN · GRAPHCORE

In this issue:

EDITORIAL

Dear readers,

Welcome to the first Newsletter of the SparCity project!

Launched in April 2021, this 3-year project is funded by the European High Performance Computing Joint Undertaking (EuroHPC JU) under the 2019 call of Extreme Scale Computing and Data Driven Technologies for research and innovation actions.

The SparCity project aims at creating a supercomputing framework that will provide efficient algorithms and coherent tools specifically designed for maximizing the performance and energy efficiency of sparse computations on emerging HPC systems, while also opening up new usage areas for sparse computations in data analytics and deep learning.

SparCity delivers a coherent collection of innovative algorithms and tools for enabling both high efficiency of sparse computations on emerging hardware platforms.

The SparCity Coordination,

Didem Unat

In-person Meeting | September 1-3, 2022 (Istanbul, Turkey)

PAST EVENTS

☒ Kick-Off Meeting | April 1, 2021

The meeting was held online with PIs and staff administrative from the consortium.

☒ Technical Meeting I | May 3, 2021

Koç University, INESC-ID and Simula Research Laboratory AS presented the ongoing work related to the SparCity project.

☒ EuroHPC Meeting| May 4, 2021

The 10 EuroHPC granted under the same call were gathered to start cooperating to establish a collaboration plan and work together. SparCity initiated collaboration plans with eProcessor and DCoMEX projects to jointly address the performance and scalability issues of sparse computations.

☒ EuroHPC Mini-Workshop | May 25, 2021

The 10 EuroHPC introduced the projects.

☒ Administrative Meeting I | May 26, 2021

This meeting was held to prepare non-technical deliverables (innovation, communication, collaboration, and data management plan).

☒ Technical Meeting II | May 31, 2021

GraphCore, Sabanci University and LMU presented the ongoing work related to the SparCity project.

☒ Innovation Workshop | 23 June, 2021

The consortium gathered in a meeting to discuss the initial SparCity Innovation Plan, in which the methodology and the tools for tracking the maturation of the project's innovations towards the exploitation phase were described.

☒ Administrative Meeting II | 26 October, 2021

This meeting was important to brainstorm about the SparCity framework, working group meetings and the collaboration plan.

☒ Technical Meeting III | 5 November, 2021

Koç University, INESC-ID, Simula and Sabanci shared their ongoing work related to the SparCity project.

☒ Administrative Meeting III | January 27, 2022

The consortium planned the preparation of the deliverables to be submitted in the next few months.

☒ Administrative Meeting IV | March 4, 2022

☒ Technical Meeting IV | April 29, 2022

Progress presentations by three of the SparCity workpackage leaders (WP1, 2 and 3).

☒ Technical Meeting V | May 20, 2022

Progress presentations by four WP leaders (WP4, 5, 6 and 7).

☒ Technical Meeting VI | June 3, 2022

☒ Technical Meeting VII |July 1, 2022

☒ PI Meeting |July 8, 2022

☒ Administrative Meeting | July 13, 2022

☒ In person Meeting | September 1-3, 2022

Team members of the different SparCity partners met—for the first time in person—in Istanbul to present and discuss the developed work in each work package. A very productive meeting with lively discussions.
It was amazing to meet you all in person!

COMMUNICATION, DISSEMINATION & OUTREACH

♦**SNN Workshop 2021**
May 25, 2021, Online
Arjun Chandra, Taha Atahan Akyıldız

♦**University ParCore Lab**
June 4, 2021, Online
Didem Unat

♦**ISC High Performance 2021**
24 June - 2 July 2021, Online
Aleksandar Ilic, Diogo Marques, Rafael Campos
Didem Unat

♦**Euro-Par 2021**
August 30, 2021, Online
Leonel Sousa, Aleksandar Ilic, Ricardo Nobre, Didem Unat

♦**2021 Handbook of European HPC projects**
August 31, 2021, Online

♦**SC21 Workshop: Redefining Scalability for Diversely Heterogeneous Architectures**
November 14-19, 2021, Online
Aleksandar Ilic, Diogo Marques, Rafael Campos
Aleksandar Ilic

♦**EuroCC Turkey SeminarsEuroC**
Turkey Seminars
January 27, 2022
Didem Unat

♦**KUIS AI talk, Koç University**
April 28, 2022
Arjun Chandra

♦**BASARIM 2022**
May 11-13, 2022, Istanbul
Didem Unat

♦**ISC High Performance 2022**
May 29—June 2, 2022, Hamburg
Didem Unat

♦**IPDPS 2022 Conference**
May 30 - June 3, 2022, Hybrid
Amro Alabsi Aljundi, Taha Atahan Akyıldız, Kamer Kaya

♦**Euro-Par 2022**
August 22-26, 2022, Hybrid
Didem Unat

♦**NANDA Workshop**
September 5-6, 2022, Imperial College London
Didem Unat

PUBLICATIONS

♦Ricardo Nobre, Aleksandar Ilic, Sergio Santander-Jiménez, and Leonel Sousa (2021). Fourth-Order Exhaustive Epistasis Detection for the xPU Era. 50th International Conference on Parallel Processing. Association for Computing Machinery, New York, NY, USA, Article 27, 110. DOI:10.1145/3472456.3472509.

♦Diogo Marques, Aleksandar Ilic, and Leonel Sousa (2021). Mansard Roofline Model: Reinforcing the Accuracy of the Roofs. ACM Trans. Model. Perform. Eval. Comput. Syst. 6, 2, Article 7. DOI:10.1145/3475866.

♦Luk Burchard, Johannes Moe, Daniel Thilo Schroeder, Konstantin Pogorelov, and Johannes Langguth (2021). iPUG: Accelerating Breadth-First Graph Traversals Using Manycore Graphcore IPUs. High Performance Computing. ISC High Performance 2021. Lecture Notes in Computer Science, vol 12728. Springer, Cham. DOI:10.1007/978-3-030-78713-4_16.

♦Amro Alabsi Aljundi, Taha Atahan Akyildiz, and Kamer Kaya (2021). Boosting Graph Embedding on a Single GPU. IEEE Transactions on Parallel and Distributed Systems, vol. 33, no. 11, pp. 3092-3105. DOI:10.1109/TPDS.2021.3129617.

♦Luk Burchard, Xing Cai, and Johannes Langguth (2021). iPUG for Multiple Graphcore IPUs: Optimizing Performance and Scalability of Parallel Breadth-First Search. IEEE 28th International Conference on High Performance Computing, Data, and Analytics (HiPC), pp. 162-171. DOI:10.1109/HiPC53243.2021.00030.

♦Ricardo Nobre, Aleksandar Ilic, Sergio Santander-Jiménez, and Leonel Sousa (2022). Tensor-Accelerated Fourth-Order Epistasis Detection on GPUs. 51st International Conference on Parallel Processing (ICPP '22), August 29-September 1, 2022, Bordeaux, France. ACM, New York, NY, USA, 11 pages. DOI: 10.1145/3545008.3545066.

♦Diogo Marques, Rafael Campos, Sergio Santander-Jiménez, Zakhar Matveev, Leonel Sousa, and Aleksandar Ilic (2022). Unlocking Personalized Healthcare on Modern CPUs/GPUs: Three-way Gene Interaction Study. 2022 IEEE International Parallel and Distributed Processing Symposium (IPDPS), pp. 146-156. DOI:10.1109/IPDPS53621.2022.00023.

♦Amro Alabsi Aljundi, Taha Atahan Akyıldız, and Kamer Kaya (2022). Degree-Aware Kernels for Computing Jaccard Weights on GPUs. 2022 IEEE International Parallel and Distributed Processing Symposium (IPDPS), pp. 897-907. DOI: 10.1109/IPDPS53621.2022.00092.

♦Gökhan Göktürk and Kamer Kaya (2022). Fast and High-Quality Influence Maximization on Multiple GPUs. 2022 IEEE International Parallel and Distributed Processing Symposium (IPDPS), pp. 897-907. DOI: 10.1109/IPDPS53621.2022.00092.

RESOURCES

Core set of features of sparse computation

It can be used as an input to performance modeling and prediction, performance and energy optimizations of sparse computation was provided in D1.1 – Core Set of Sparse Computation Features.

The source code that computes the feature set is available at the project GitHub repository.

SparseBase Launch

We are pleased to announce the release of **SparseBase** v0.2.0*, a public C++ library to be used in research, created by the Sabanci University team and contributed by other SparCity partners.

The main features of this release include:

♦Formats; a generic representation model for sparse data structures.

♦A Preprocessing mechanism that is highly generic and robust.

♦A Feature extraction mechanism for sparse matrices and sparse tensors.

♦The Extractor object, which is capable of using multiple extractors to carry out efficient feature extraction, as well as merge features into fused kernels (when possible).

♦Support for GPU formats, preprocessing, and feature extraction.

♦An efficient binary file format for fast reading and writing.

♦Parallel I/O using PIGO (currently only available for Linux.

♦A Header-only mode as well as a compiled mode.

♦Two tutorials demonstrating how to use reordering, feature extraction, format conversion, and basic I/O.

♦Guides on how to add a reordering algorithm and how to add a feature extraction algorithm to the library.

♦Documentation of the API of the library.

♦Unit tests for the majority of the library.

You can find the library repository and the full documentation here.

**The library is in the early stages of development. Suggestions/bug reports can be made by opening an issue on Github and are greatly appreciated.*

UPCOMING EVENTS

♦Collaboration Workshop, Madrid
September 19-20, 2022

♦SparCity in the HIPEAC Workshops: EuroHPC projects shaping Europe's HPC landscape Workshop
January 17, 2022

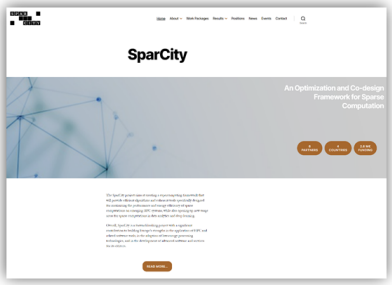
Workshop on Machine Learning Techniques for Software Development and Optimization (MLOpt)
January 16, 2022

♦First Review Meeting, Luxembourg
November 10, 2022

♦Meeting with the Advisory Board
October 14, 2022

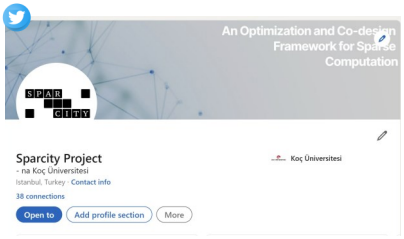
♦SparCity Workshop I (HIPEAC), Toulouse
January 16, 2022

WEBSITE



https://sparcity.eu

SOCIAL MEDIA



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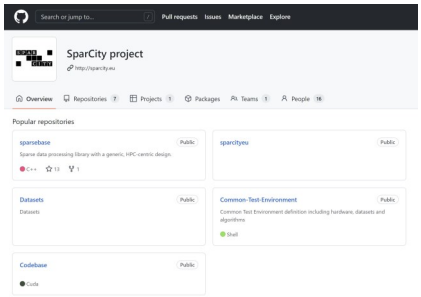
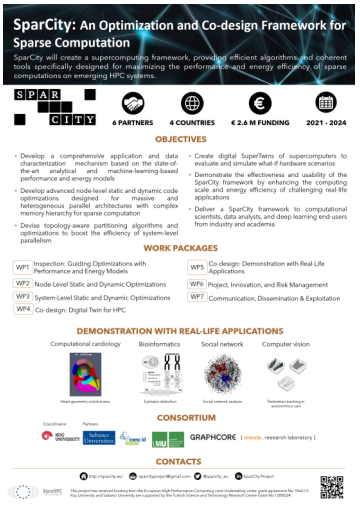


https://github.com/sparcityeu

PROMOTIONAL MATERIALS

SparCity Posters



MORE INFORMATION

https://sparcity.eu

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