

PUNCH4NFDI

Task Area 3

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Scope and Title

- Something between TA2 and TA4
 - Transformation of data
 - Methods / Algorithms / Software / Libraries
 - Workflows
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- Methods for maximizing the scientific value of data
 - Scientific workflows
 - Workflows to extract knowledge from data
 - Workflows and methods for data-driven science
 - ...
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- ➔ Should not be too science case specific

WP: Statistical Methods

- WP leaders: Kevin Kröninger, Joe Mohr
- Fits of complex models with many parameters to huge datasets in a resource efficient way
- Extraction of tiny signals in the presence of large backgrounds
- ➔ Bayesian Analysis Toolkit
- ➔ Similar tools @ Astro
- Integration / extension / consolidation of existing tools
- Co-applicants: Dortmund, Munich
Partners: Frankfurt

WP: Numerical Methods and Simulations

- WP leaders: Susanne Pfalzner, Frithjof Karsch
 - Solvers for large matrices
 - Optimizations for specific hardware architectures
 - Efficient use of highly parallel architectures
 - ➔ Lattice QCD libraries
 - ➔ ...
 - Generalization of tools?
- Co-applicants: Bielefeld, Regensburg, Jülich

WP: Machine Learning Methods

- WP leaders: Gregor Kasieczka, Marcus Brüggen
- Automated optimization of model hyperparameters for a large variety of problems
- Federated learning on very large (petabyte), partitioned datasets
- Interpretation, reliability and visualization of machine learning results
- ➔ Expertise on machine learning applications in various cases
- Co-applicants: Hamburg

WP: Methods for Analyses Across Datasets

- WP leaders: Joe Mohr, Thomas Kuhr
- Combination of results at likelihood level
- „Code to data” for analyses of large datasets (or data collections), potentially distributed across multiple locations and stored in a non-uniform format
- ➔ Grid tools for „code to data”, but solutions often experiment specific and developed for the case of statistically independent events
- Simultaneous analysis of multiple data chunks, potentially from different sources
- Co-applicants: Munich

Curation of Libraries?

- Provide containers that support a large number of workflows in our community
- Make them easily findable and usable from the user interface provided by TA4

If you want to contribute to TA3

- Mailing list: punch4nfdi-ta3@desy.de
- Meetings: Tuesdays at 14:00,
Zoom: <https://lmu-munich.zoom.us/j/95144330211?pwd=QnQ1QVpwMXdLN3NuaWtLcTVuK2dRZz09>
- Get in contact with TA/WP leaders
and sign up for deliverables!