

Research Software Directory

what is it? why did we built it? what's in it for you?

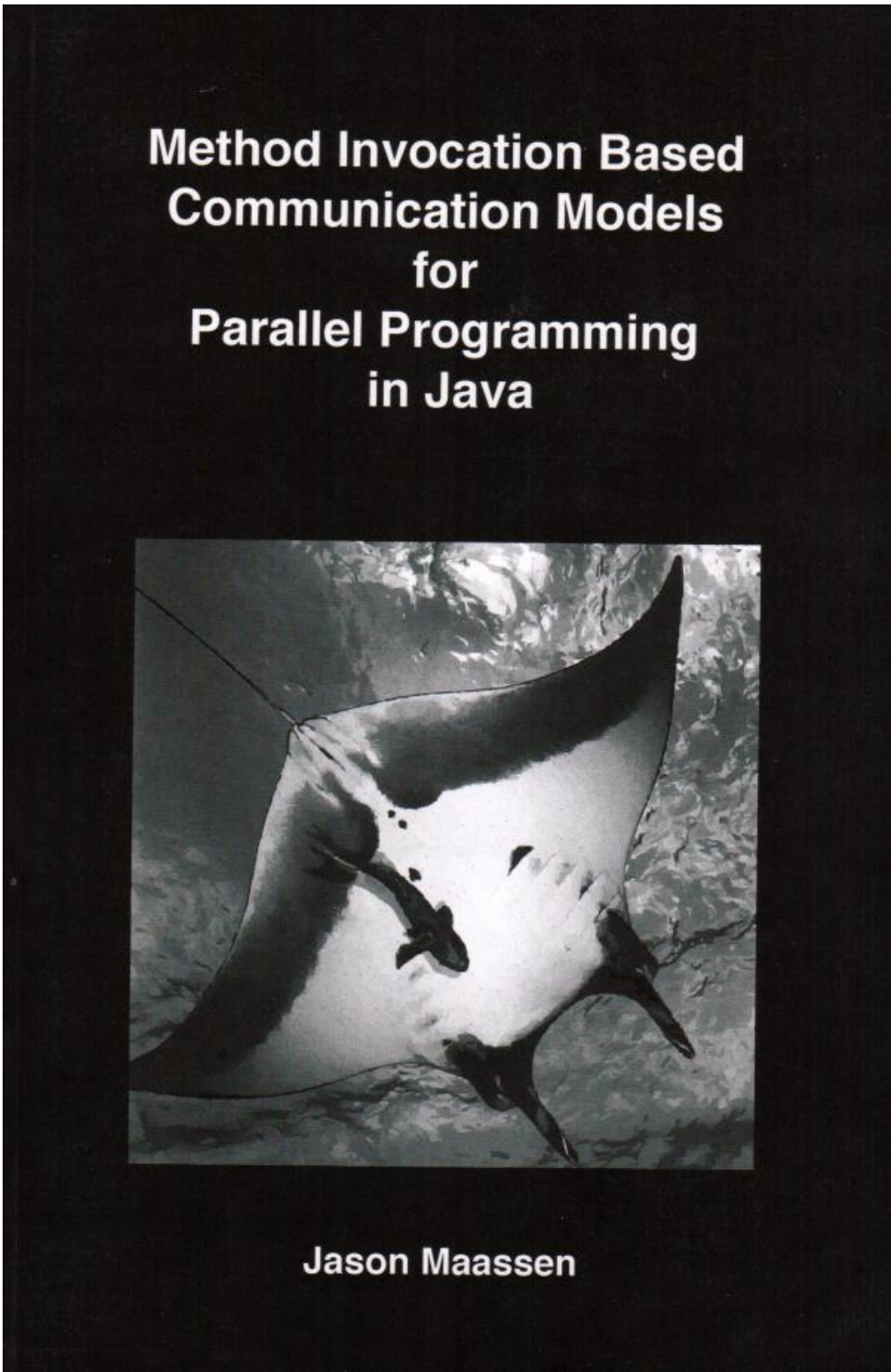
Jason Maassen

FAIR Research IT Innovation Lunch (UU)

12/09/2022



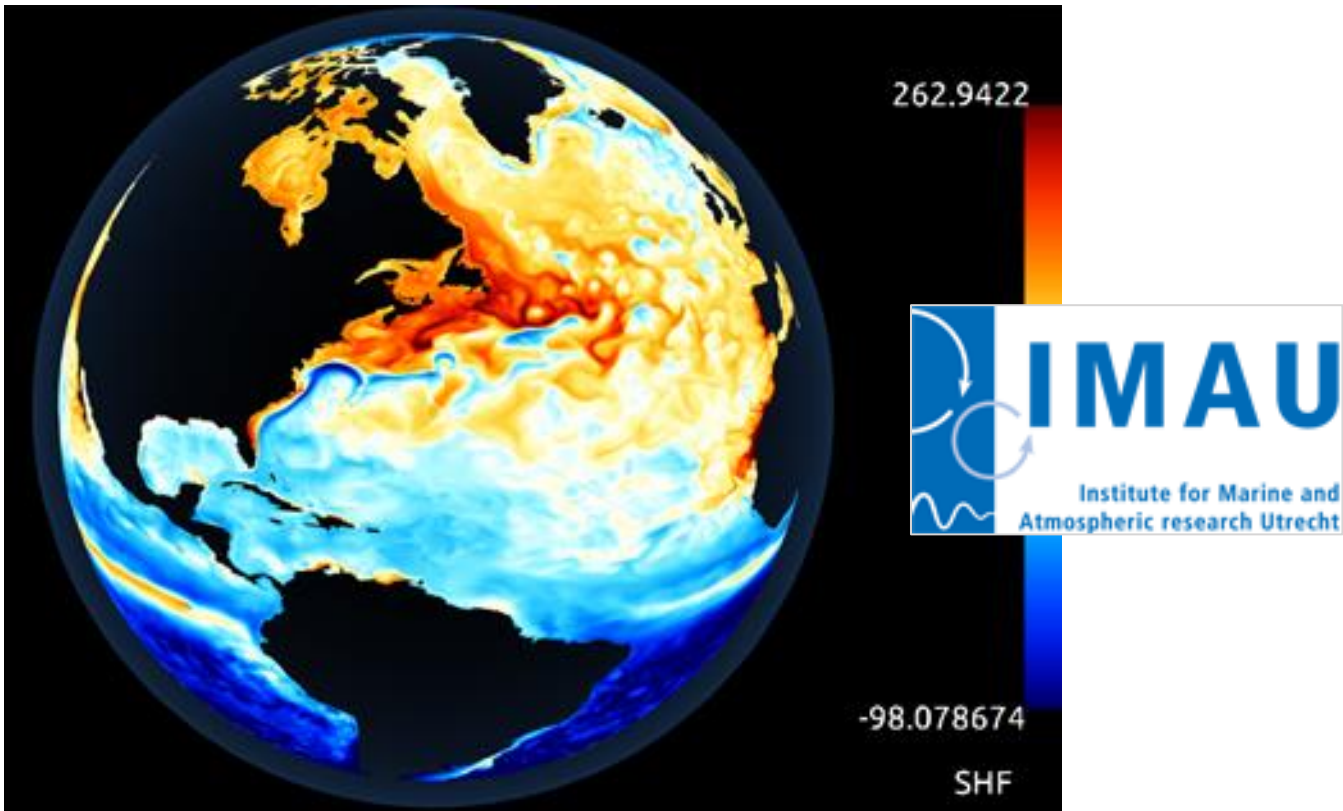
My background



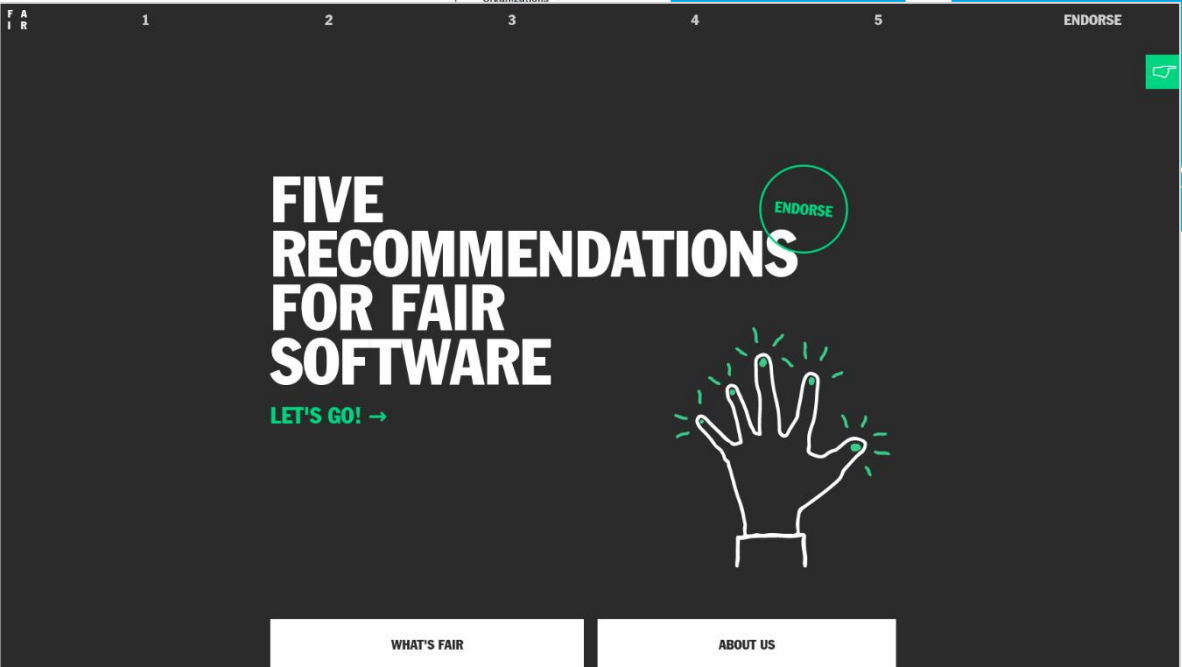
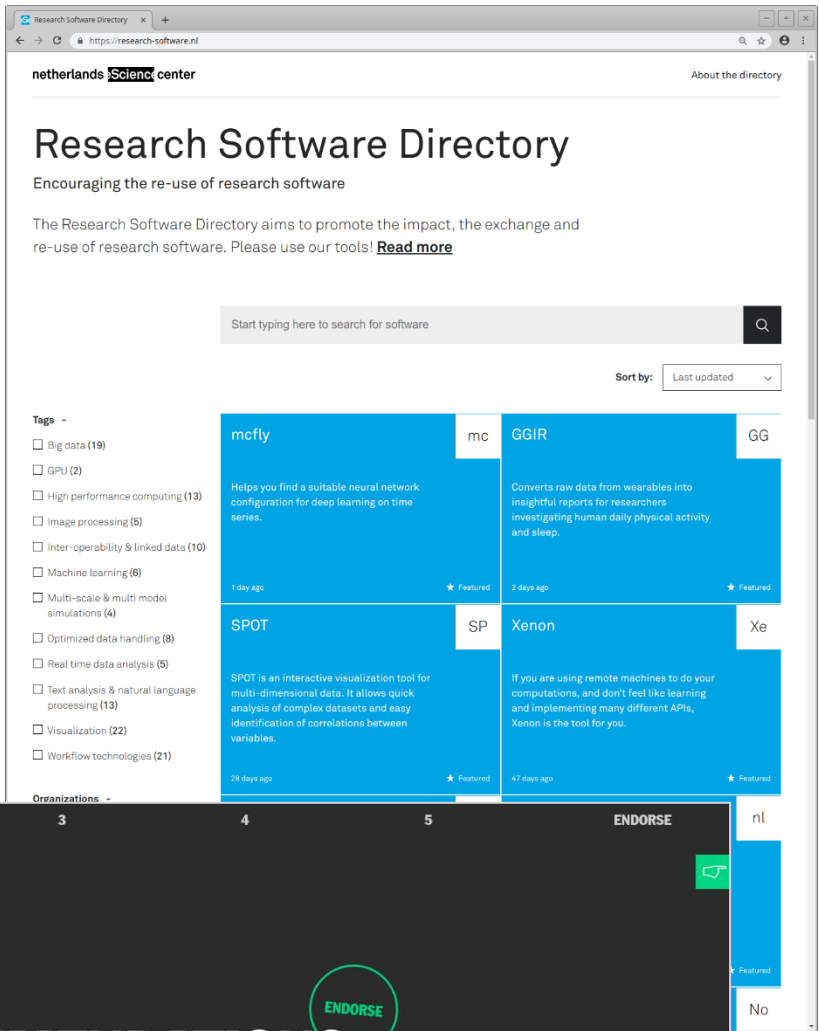
1998-2012 PhD / Postdoc
Computer Science
HPC / Grid computing



UNIVERSITEIT VAN AMSTERDAM



2012+ RSE
Ocean Modelling
Digital Forensics



2016+ TechLead
Efficient Computing
Research Software Quality & FAIRness,



An aerial photograph of Science Park Amsterdam. The image shows a large complex of modern buildings, mostly with grey and white facades, situated along a canal. A blue circle highlights a specific building in the middle ground. The surrounding area includes green spaces, trees, and other urban infrastructure. In the background, a bridge crosses the canal, and the city of Amsterdam is visible in the distance.

netherlands **eScience** center

National center for the development
and application of research software

Founded in 2011 by NWO and SURF
Science Park Amsterdam



Bridging the gap between:

research <-> research IT infrastructure
research <-> computer and data science



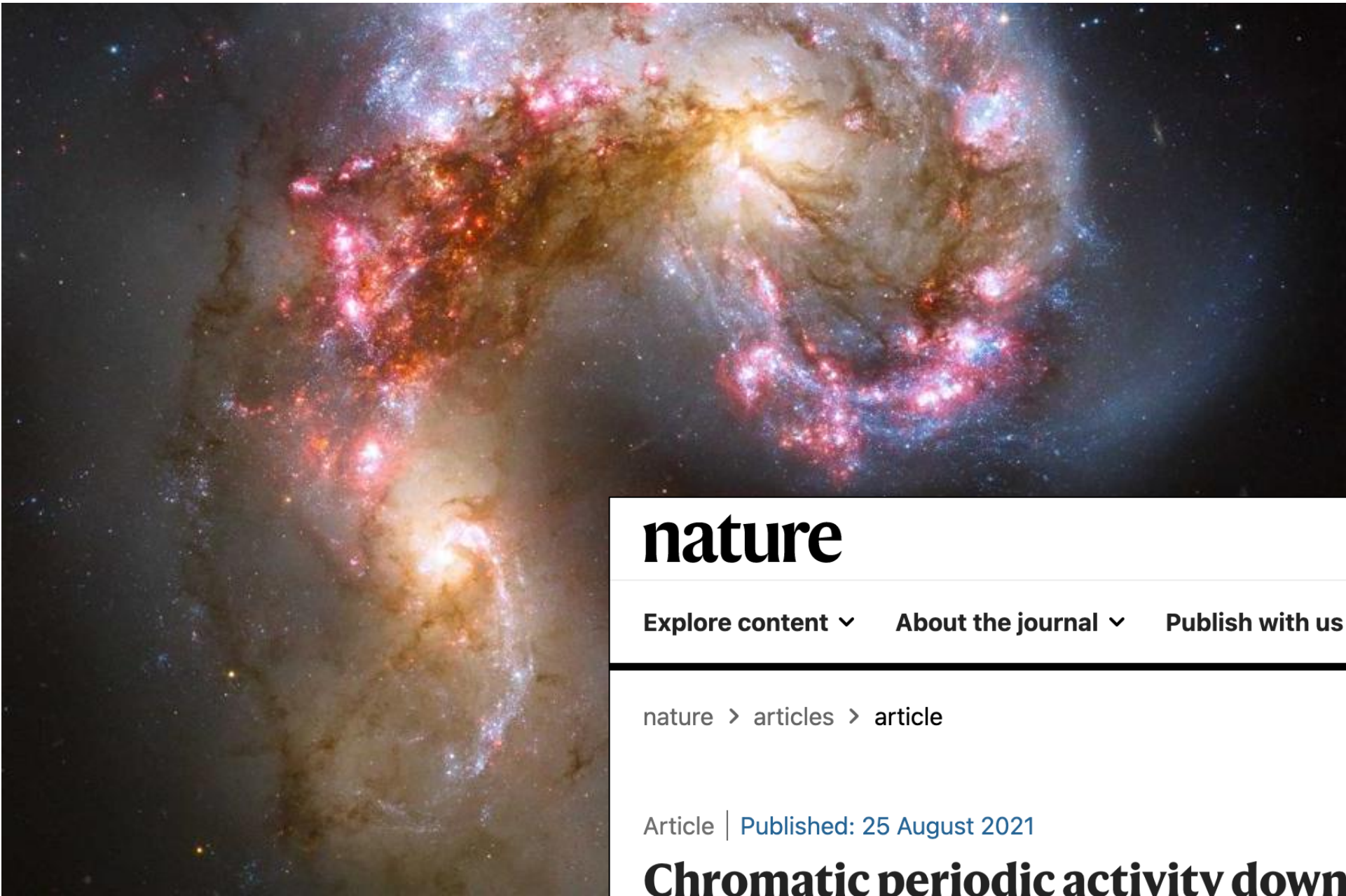
We fund collaborative projects (in-kind)

- Driven by research challenges faced by project partners
- We provide Research Software Engineers (RSEs)
- Translate research questions into modern software/e-infrastructure solutions
- Reuse and broad impact is important
- Open science, open source, open data, open access, ...

~200 projects
(on many different topics)

Astronomy: fast radio bursts

In collaboration with ASTRON & UvA



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Article | [Published: 25 August 2021](#)

Chromatic periodic activity down to 120 megahertz in a fast radio burst

[Inés Pastor-Marazuela](#), [Liam Connor](#), [...] [Stefan J. Wijnholds](#)

[Nature](#) **596**, 505–508 (2021) | [Cite this article](#)

1349 Accesses | **161** Altmetric | [Metrics](#)

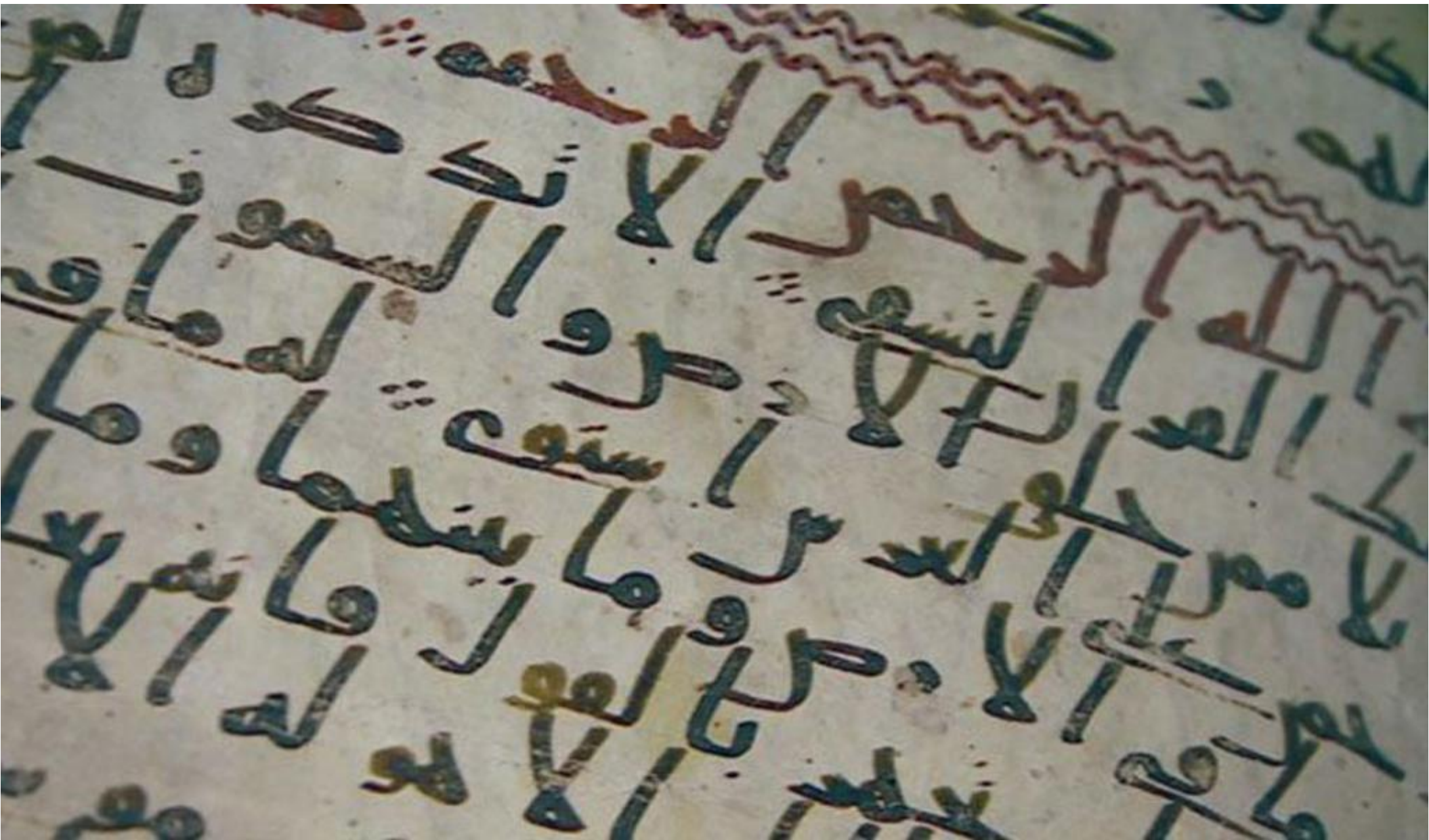
Abstract

Fast radio bursts (FRBs) are extragalactic astrophysical transients¹ whose brightness requires emitters that are highly energetic yet compact enough to produce the short, millisecond-duration bursts. FRBs have thus far been detected at frequencies from 8 gigahertz (ref. ²) down to 300 megahertz (ref. ³), but lower-frequency emission has



Digital Humanities: Arabic-Islamic corpus

In collaboration with Utrecht University



The Why of the Research Software Directory

[illegible]

Our main contribution to research & main output as an institute is **research software**.

In 2011-2016, very little credit was given to research software or the people developing it

How do we show the impact we have had on research to our funders?

Being RSEs we decided that we should build software to solve this problem ;-)

FAIR FOR SOFTWARE:
Reproducible Open Science ⑦

Software solution to
their scientific problem.

Research Software Directory

2017-now

connect
③

① Research Software Users
② Search Cite.
Quality + trust.
Ranking
④ Open API

Roi
Statistics.
Impact.

⑥ Funders
Policy makers

⑤ Research Groups /
Institutes / projects

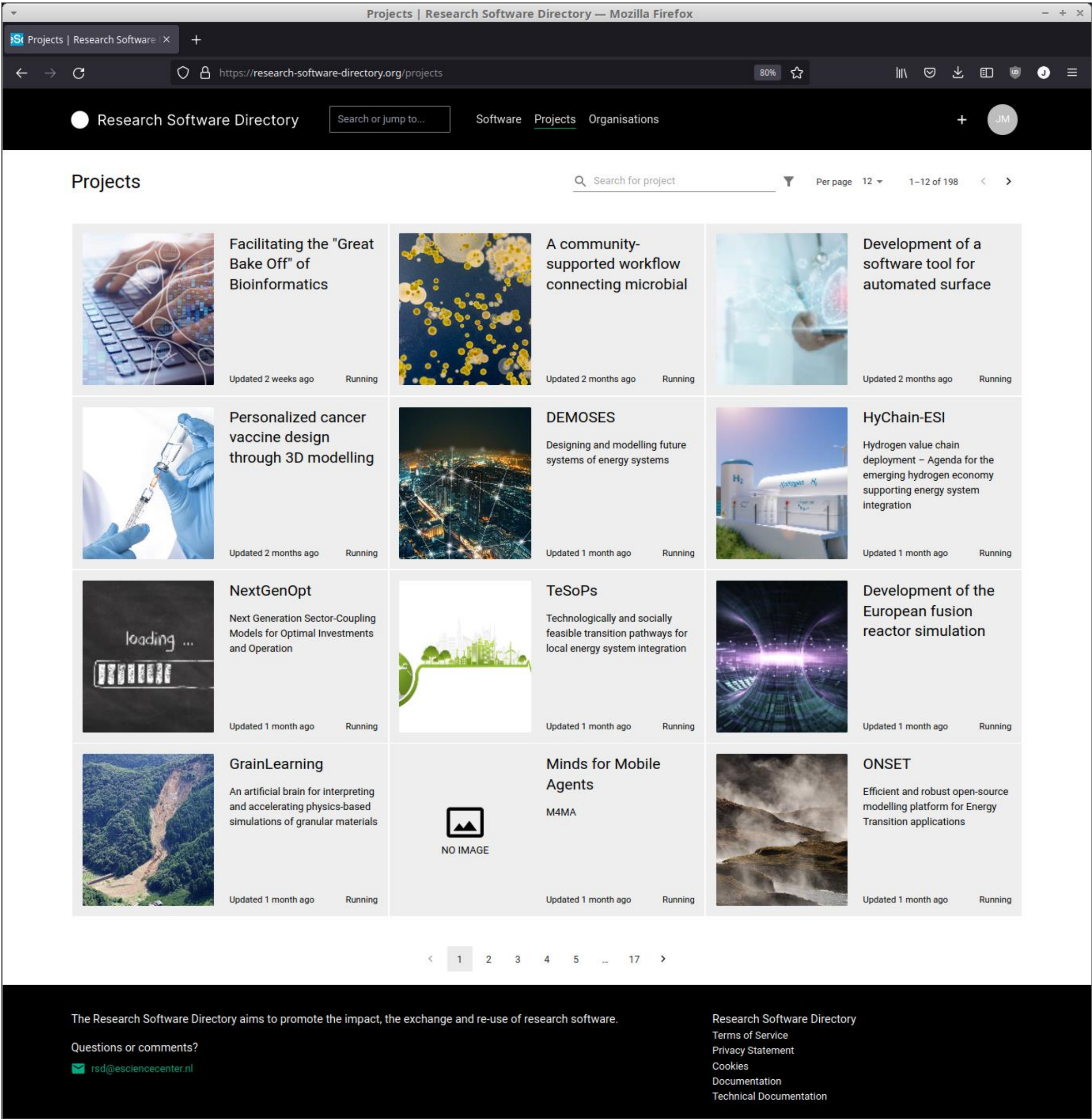
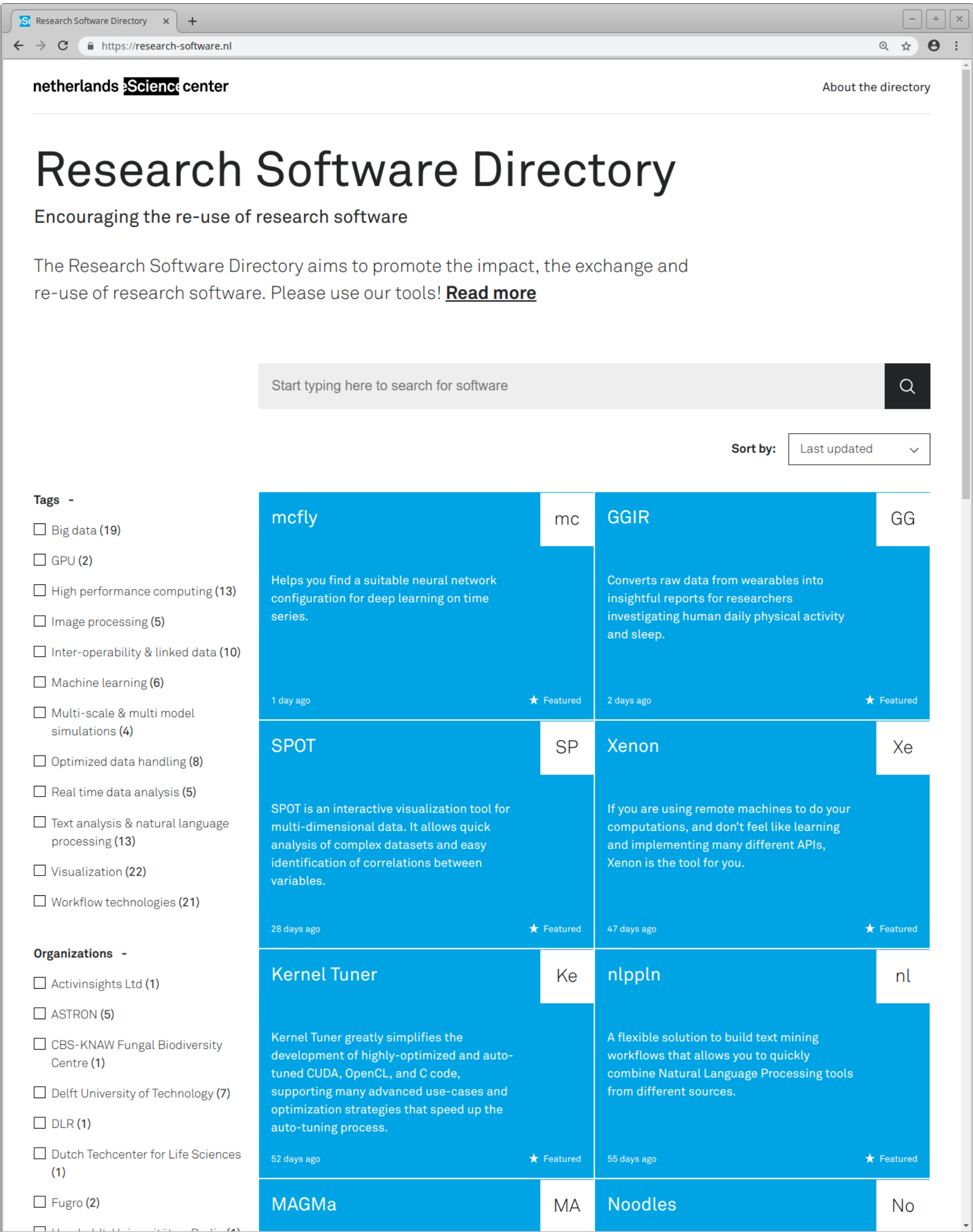
Software
+ metadata
⑧

Citable
visibility
re-use
⑨

Credits / impact / community building.

Research Software
Developers

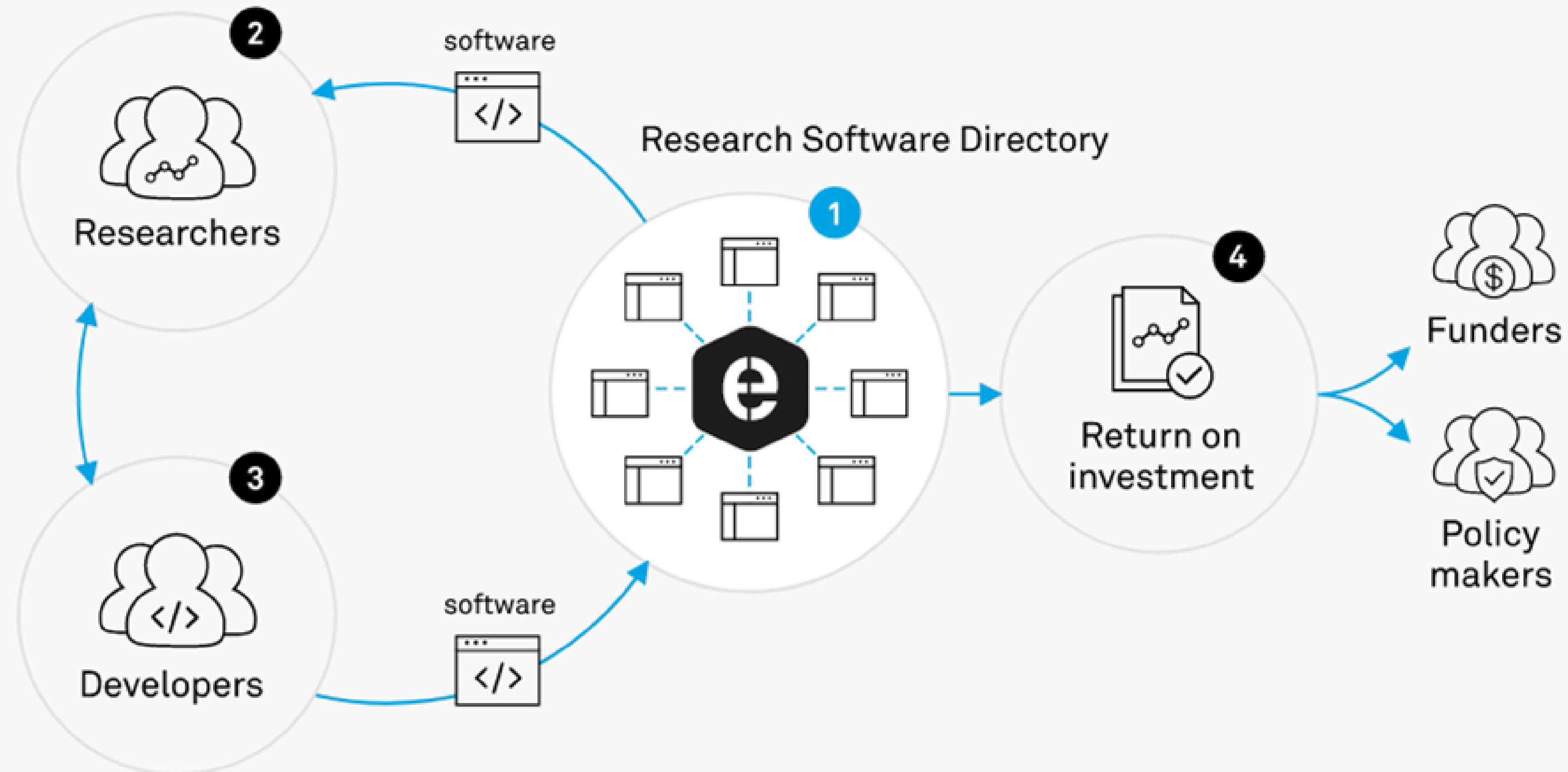
Research Software Directory (evolution from 2017 to 2022)



2017: self hosted, eScience Center only

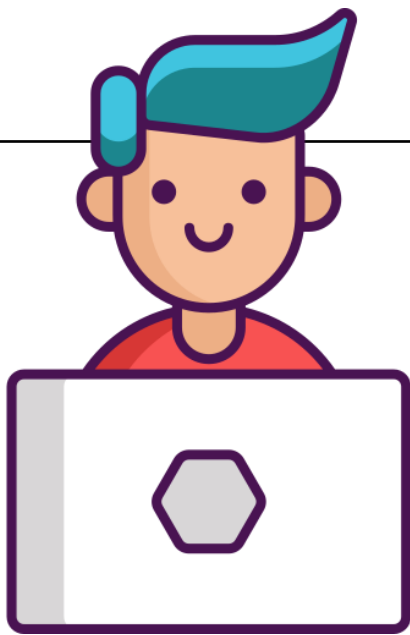
2022: online service, many organizations

Research Software Directory: a CMS / CRIS for Research Software



Target Groups:

- RSEs, researchers (3): showcase software, show impact, make software findable
- Researchers, RSEs (2): find software, judge relevance, citation info
- Institutes, funders, policy makers (4): insights into impact of research software & RSEs



name
description
relevant IDs
testimonials
roles

create software &
project pages



organization ID
proper name
website URL



contributor ID
proper name
affiliation

Connecting Research
and Researchers



concept DOI
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Kernel Tuner

29 members
13 contributions

Kernel Tuner greatly simplifies the development of highly-optimized and auto-tuned CUDA, OpenCL, and C code, supporting many advanced use-cases and optimization strategies that speed up the auto-tuning process.

Get started →

1056 commits (Last commit = 2 weeks ago)

Cite this software

DOI

Copy to clipboard

Choose a version

0.4.2

Choose a reference manager format

Download file

What Kernel Tuner can do for you

- Allows developers to easily unit test and auto tune GPU code
- Generic auto-tuning of user defined parameters for CUDA, OpenCL, and C kernels
- Supports more than 20 different search optimization methods to speedup tuning
- Successfully used in 16 different education projects, across various disciplines

Kernel Tuner simplifies the development of efficient GPU programs, or kernels. It does so by making kernels written in C/C++, OpenCL, or CUDA accessible from Python, while taking care of the required synchronization between data kept in host memory and data kept in device memory.

This has a number of advantages. First, it simplifies auto-tuning of the kernel parameters. In fact, Kernel Tuner comes standard with a variety of strategies for efficiently searching the parameter space, leading to greatly improved performance of tuned kernels. Second, it allows for unit testing of GPU code from within Python.

Kernel Tuner does not add any additional dependencies to the kernel code, and does not require extensive code changes. Furthermore, it is noteworthy that kernels tuned by Kernel Tuner do not require any changes after tuning to make them production ready—tuned kernels can be used as-is from any host programming language.

Keywords

[Big data](#)
[GPU](#)
[High performance computing](#)
[Multi-scale & multi model simulations](#)
[Optimized data handling](#)
[Real time data analysis](#)

[Programming language](#)
Python: 99%
Code: 1%

[License](#)
Apache=2.0

[Source code](#)

Participating organisations

Mentions

Kernel Tuner tutorial at Supercomputing 2021
 Author(s): Ben van Werkhoven
 Published in 2021

Writing Testable GPU Code
 Author(s): Ben van Werkhoven
 Published in 2018

[Computer programs](#)
[Conference papers](#)
[Journal articles](#)
[Presentations](#)
[Video recordings](#)

Testimonials

"With Kernel Tuner, we were able to accelerate our CUDA kernels by a factor of 10 in just a few weeks"

— Chiel van Heerwaarden, Wageningen University & Research

Contributors

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Nicolas Renaud
Netherlands eScience Center

Patrick Bos
Netherlands eScience Center

Richard Schoonhoven
Cwi

Stijn Heldens
Netherlands eScience Center

Wittem Jan Palenstijn
Cwi

Related projects

CORTEX
Self-learning machines hunt for explosions in

CHEOPS
Verified construction of correct and optimised

software pages

project pages

- Research Software Directory

organization
pages

[Software](#)
[Projects](#)
[Organisations](#)

Organisations

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<div>Delft University of Technology</div> <div> </div> <div> 11 software packages 22 research projects </div>	<div>Utrecht University</div> <div> </div> <div> 12 software packages 20 research projects </div>	<div>Radboud University Nijmegen</div> <div> </div> <div> 17 software packages 12 research projects </div>
<div>Wageningen University & Research</div> <div> </div> <div> 12 software packages 15 research projects </div>	<div>University of Twente</div> <div> </div> <div> 6 software packages 16 research projects </div>	<div>ASTRON</div> <div> </div> <div> 9 software packages 11 research projects </div>
<div>SURF-sara</div> <div> </div> <div> 4 software packages 13 research projects </div>	<div>University of Groningen</div> <div> </div> <div> 4 software packages 11 research projects </div>	<div>CWI</div> <div> </div> <div> 1 software package 13 research projects </div>

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16

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The Research Software Directory aims to promote the impact, the exchange and re-use of research software.

Research Software Directory
Terms of Service
Privacy Statement
Cookies
Documentation
Technical Documentation

impact
metrics
(TODO)

4278

- Tweeted by 3838
- Blogged by 24
- On 895 Facebook pages
- Mentioned in 54 Google+ posts
- Picked up by 28 news outlets
- Reddited by 15
- 5 readers on Mendeley
- 0 readers on CiteULike

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[Organisations](#)

Googleing the cancer genome

Identification and prioritization of cancer-causing structural variations in whole genomes

Status

Dec 2016 / Finished Dec 2020

Funded under
Grant ID: 7197-6003

[Project links](#)

Code repository

Research domains

LS

Keywords

High performance computing

Machine learning

Workflow technologies

Image Wikipedia

Cancer affects millions of people worldwide. With the advent of novel DNA sequencing techniques, genome sequencing has now started to become part of a routine workflow for cancer diagnostics and potentially enables fine-tuned treatment strategies tailored towards individual cancer patients. In spite of the massive genomic data production, systematic and comprehensive analysis of these data in particular regarding the detection and interpretation of structural variation, are lagging behind due to computational and algorithmic limitations.

In this project, we will create novel analytical and computational frameworks that lead to fast, cost-efficient and comprehensive detection and annotation of structural variations in cancer genomes. We particularly focus on previously neglected variations occurring in unexplored regions of the cancer genome. Our methods will serve as an important component in future genome-first based clinical-decision making for cancer patients and is essential to drive discovery of novel cancer genes and mechanism from modern-day whole genome sequencing data.

Participating organisations

Netherlands eScience center
 Utrecht University

Impact

Journal articles ⁽¹⁾

Output

Portable HPC workflows with Snakemake, Conda, and Xenon
 Author(s) Jeroen H. Spauw
 Published in 2018

Teaching machines to recognize cancer
 Author(s) Netherlands eScience Center
 Published in 2017

Computer programs ⁽¹⁾
Conference papers ⁽¹⁾
Dataset ⁽¹⁾
Journal articles ⁽¹⁾
Presentations ⁽¹⁾
Reports ⁽¹⁾

Team

Arnold Kuznir
eScience Research Engineer
Netherlands eScience Center
 Jeroen de Ridder
Principal Investigator
University Medical Center Utrecht
 Luca Santuari
PhD student
University Medical Center Utrecht

Lars Ridder
Netherlands eScience Center
[✉ Mail Lars](#)

Sonja Georgijevska
eScience Research Engineer
Netherlands eScience Center

Related projects

Integrated omics analysis for small molecule-mediated host-microbiome interactions
Advancing our understanding of molecular mechanisms of health and disease
Updated 1 day ago / Finished
 DeepRank
Scoring 3D protein-protein interaction models using deep learning
Updated 2 months ago / Finished
 Data quality in a distributed learning environment
Vast amounts of data to improve cancer treatment decisions
Updated 2 months ago / Finished
 TraIT
A sustainable infrastructure for translational medical research
Updated 2 months ago / Finished

Related tools

mcfly Helps you find a suitable neural network configuration for deep learning on time series. Updated 2 months ago 11 mentions, 8 contributors	sv-callers Highly portable parallel workflow to detect structural variants in cancer genomes. Updated 2 months ago 10 mentions, 4 contributors
sv-channels Genome-wide detection of structural variants using deep learning Updated 2 months ago 4 mentions, 4 contributors	sv-gen Highly portable parallel workflow to generate artificial genomes with structural variants. Updated 2 months ago 5 contributors
Xenon	Xenon command line interface

Current team(s)



Maaïke de Jong



Jason Maassen



Jesus Garcia



Ewan Cahen



Dusan Mijatovic



Martin Hammitzsch



Christian Meessen



Sven Reiland



Markus Bradke



Matthias Rüster



Norman Ziegner



Tobias Huste



Rudy Scholte



Ronald van Schijndel



Jacob Rousseau



Laurents Sesink



Jacko Koster



Dan Rudmann



Maarten Hoogerwerf



Martine de Vos



Rik Janssen

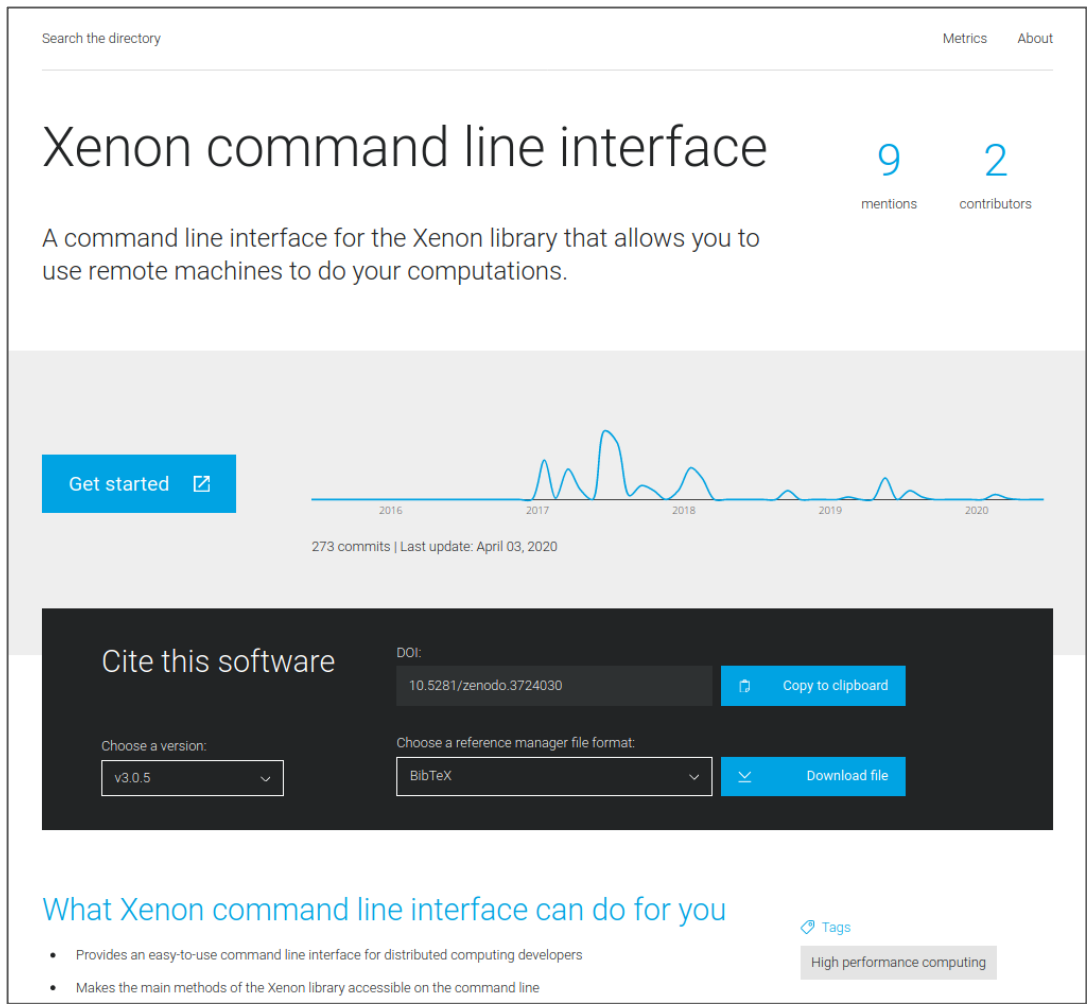


Universiteit Utrecht

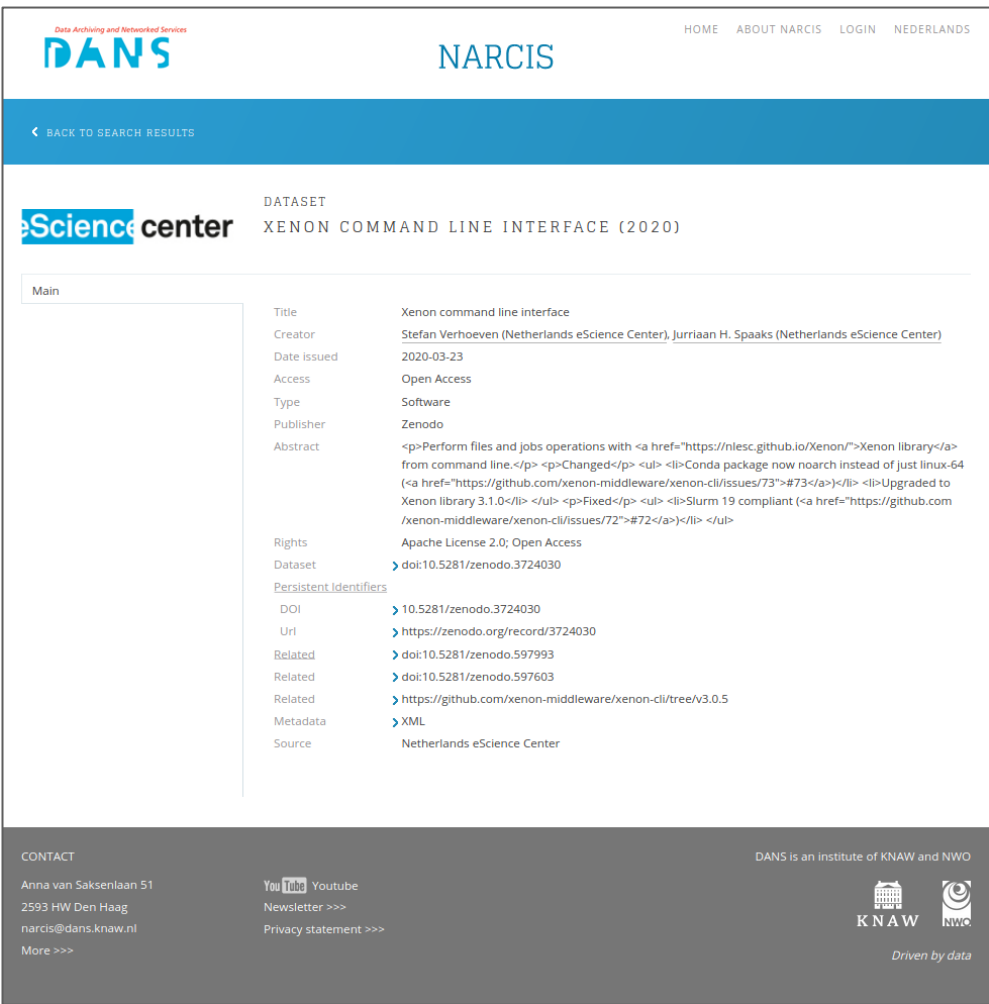
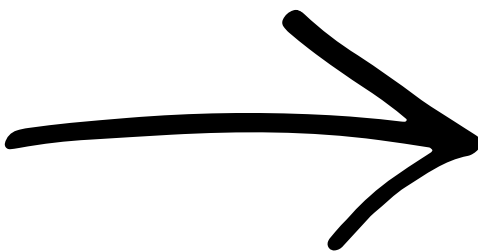


Current status

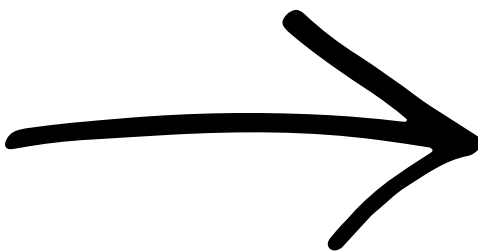
- Used in production at eScience Center, Utrecht University and Helmholtz
- Leiden University and Amsterdam UMC being connected
- Our data is harvested by NARCIS and OpenAIRE (via NARCIS)
- Currently working on REST APIs to exchange data with other services



Research Software Directory



NARCIS (DANS)



OpenAIRE (EOSC)

Launch event on 22 November 2022

<https://research-software-directory.org>

<https://research.software>

rsd@esciencecenter.nl

<https://github.com/research-software-directory/RSD-as-a-service>