Annual report 2019

Enabling digitally enhanced research

Start reading
Dear reader,

I am pleased to present our annual report for 2019. It has been a busy but successful year for the Netherlands eScience Center. There is much to look back on.

Our first milestone came in February, when an international assessment committee reviewed the quality, impact, relevance and viability of the eScience Center over the period January 2014 to June 2018. I am proud to say that the outcome was very positive, with the committee particularly impressed with the technological expertise of the eScience Center and the excellent quality of its research. It also underlined our position as a “national center of excellence” within the Dutch eScience landscape.

Besides confirming the importance and value of our work, the review forms the basis for a new 5-year collaborative agreement with SURF and NWO, which we are currently negotiating and will, in all likelihood, sign in 2020. Alongside this new agreement, we also secured additional structural funding as part of the government’s increased investment in digital research infrastructure. This is great news and will play a major role in the sustainable growth and reach of our organization over the coming years.

Internally, 2019 was a year of change for the eScience Center. We said farewell to our former director Wilco Hazeleger and welcomed Joris van Eijnatten as our new head. Moreover, the number of employees grew further to 70 as a result of our projects and the increasing range of activities we are either coordinating or taking part in.

As for our projects and activities, we achieved several notable achievements. First, we kicked off public-private projects in the area of big data and health, and in earth
observation. Calls were also launched for collaborative projects for the "Big Sciences" (oTEC–BIG) and for Energy System Integration (ESI-far). We also acquired several externally funded projects in EU and NWO calls. Moreover, we published 78 peer-reviewed papers, 18 conference papers and completed 11 projects, including TICCLAT and EVIDENCE. In addition, our activities in the field of software development, reuse and dissemination continued to accelerate, as well as our efforts to play a visible role in promoting the transition to open science. Highlights include the launch of a new FAIR Software website, greater visibility and traction of the Research Software Directory, the inaugural NL–RSE Conference, another successful edition of the National eScience Symposium, numerous workshops and trainings, and participation in leading national and international conferences in various domains.

Looking ahead, 2020 promises to be an important year for the eScience Center. The new collaborative agreement and additional funding will enable us to continue to enable new research outcomes through the use of innovative eScience tools and methodologies. As part of our new 5-year strategy, we will also focus on pushing the methodological and technological innovations needed to put key aspects of open science, namely transparency, reuse and reproducibility, into practice. Finally, we will embrace and follow the recommendations presented in the report of the international assessment committee, while revamping the organization itself to increase both the well-being of current eScience Center employees and our attractiveness to potential new colleagues. Our aims are big.

I hope you enjoy this report.

Prof. Rob van Nieuwoort,
Acting director
We collaborate with researchers from universities and research institutes across the Netherlands on projects in every major discipline. These projects aim to deliver results with a clear benefit to digital research.
SUSTAINABILITY & ENVIRONMENT

IS-ENES3
Providing the Infrastructure to Better Understand and Project Climate Variability and Change
Dr. Sylvie Joussaume
CNRS - Centre National de la Recherche Scientifique

EMAC (ECHAM-MESSy) Atmosphere Climate Model (ESIWARE2)
Dr. Theo Christoudias
Cyprus Institute

SUSTAINABILITY & ENVIRONMENT
Blue-Action
Arctic Impact on Weather and Climate
Dr. Steffen M. Olsen
Nansen Environmental and Remote Sensing Center

TWEX
Translating Weather Extremes into the Future – A Case for Norway
Dr. Jana Stilmann
Center for International Climate Research (CICERO)

SUSTAINABILITY & ENVIRONMENT
ESIWARE2
For Future Exascale Climate and Weather Predictions
Dr. Joachim Biercamp
German Climate Computing Center (DKRZ)

ESCIENCE METHODOLOGY
AutoGraph
Automated Multi-Scale Graph Manipulation with Topological and Flow-based Methods
Prof. Hans van Lint
Delft University of Technology

PHYSICS & BEYOND
A Phase Field Model to Guide the Development and Design of Next Generation Solid State Batteries
Safer Batteries with Higher Energy Densities
Dr. Marnix Wagemaker
Delft University of Technology

PHYSICS & BEYOND
eWaterCycle II
Overcoming the Challenge of Locality Using a Community Multi-Model Environment
Prof. Nick van de Giesen
Delft University of Technology

PHYSICS & BEYOND
Scalable High-fidelity Simulations of Reacting Multiphase Flows at Transcritical Pressure
Dr. Stefan Hinkel
Delft University of Technology

SUSTAINABILITY & ENVIRONMENT
A New Perspective on Global Vegetation Water Dynamics from Radar Satellite Data
Prof. Susan Steele-Dunne
Delft University of Technology

SUSTAINABILITY & ENVIRONMENT
Remote Sensing of Damage Feedbacks and Ice Shelf Instability in Antarctica
Dr. Stef Lhermitte
Delft University of Technology

SUSTAINABILITY & ENVIRONMENT
DALES - The Dutch Atmospheric Large Eddy Simulation (ESIWARE2)
Dr. Fredrik Jansson & Prof. Pier Siebesma
Delft University of Technology
**HUMANITIES & SOCIAL SCIENCES**

**GlamMap**
Visual Analytics for the World’s Library Data
Prof. Bettina Speckmann
Eindhoven University of Technology

**ESCIENCE METHODOLOGY**

**Algorithmic Geo-visualization**
From Theory to Practice
Prof. Bettina Speckmann
Eindhoven University of Technology

**PHYSICS & BEYOND**

**MULTIXMAS**
Multiscale Simulations of Excitations Dynamics in Molecular Materials for Sustainable Energy Applications
Dr Alexey Lyulin & Dr Bjorn Baumeier
Eindhoven University of Technology

**PHYSICS & BEYOND**

**Passing XSAMS**
New Tools for Researchers in Plasma, Combustion and Chemical Reactor Science
Dr Jan van Dijk
Eindhoven University of Technology

**LIFE SCIENCES & EHEALTH**

**STRAP**
Self Tracking for Prevention and diagnosis of heart disease
Prof. Panos Markopoulos
Eindhoven University of Technology

**SLEEP RESEARCH**

**Eli Lilly**
Dr Vincent van Hees
Eli Lilly (US)

**LIFE SCIENCES & EHEALTH**

**TADPOLE-SHARE**
Sharing TADPOLE’s Algorithms for Reuse and Evaluation
Dr Esther Bron
Erasmus University Medical Center

**HUMANITIES & SOCIAL SCIENCES**

**Deep Learning OCR Post-Correction**
Evaluation and Post-correction of OCR of Digitised Historical Newspapers
Dr Janneke Zwaan
National Library of the Netherlands

**SUSTAINABILITY & ENVIRONMENT**

**MAGIC**
Metrics and Access to Global Indices for Climate Projections
Wim Som de Cerff
The Royal Netherlands Meteorological Institute (KNMI)

**SUSTAINABILITY & ENVIRONMENT**

**OBLIMAP 2.0 (ESIWACE2)**
Thomas Reerink
The Royal Netherlands Meteorological Institute (KNMI)

**SUSTAINABILITY & ENVIRONMENT**

**PRIMAVERA**
Process-Based Climate Simulation: Advances in High-Resolution Modelling and European Climate Risk Assessment
Dr Malcolm Roberts
The Royal Netherlands Meteorological Institute (KNMI)

**ESCIENCE METHODOLOGY**

**PROCESS H2020 – Providing Comp Solutions ExaScale Challenges**
Prof. Dieter Kranzlmüller
Ludwig-Maximilians Universität München
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**Digital Twins: Monitoring Ships' State in Real-time**
Advanced Data Science to Assist the Design of Cleaner, Safer and Smarter Ships
Anke Cottelle and Fenneke Sterlini
Maritime Research Institute Netherlands

**SUSTAINABILITY & ENVIRONMENT**

**European Climate Prediction System**
Developing an Innovative European Regional Ensemble Climate Prediction System
Chris Hewitt
MET Office

**ESCIENCE METHODOLOGY**

**Enhance Your Research Alliance (EYRA) Benchmark Platform**
Applying Algorithms on Benchmarks from Various Scientific Disciplines
Dr Adrienne Mendrik and Dr Annette Langedijk (SURF)
SURF (Utrecht)

**SUSTAINABILITY & ENVIRONMENT**

**ReaxPRO H2020**
Dr Stan van Gisbergen
Software for Chemistry & Materials

**PHYSICS & BEYOND**

**Automated Parallel Calculation of Collaborative Statistical Models**
Large Scale Statistical Data Analysis in Particle Physics Dr Wouter Verkerke
National Institute for Subatomic Physics (Nikhef)

**PHYSICS & BEYOND**

**IDark**
The Intelligent Dark Matter Survey
Dr Sascha Caron
National Institute for Subatomic Physics (Nikhef)

**HUMANITIES & SOCIAL SCIENCES**

**EviDENCe**
Ego Documents Events Modelling
Dr Susan Hogervorst
Open University

**LIFE SCIENCES & EHEALTH**

**DTL Semantic Analysis of Radiology Reports Utilizing Lexicon**
Unlocking Large Volumes of Knowledge Locked in Natural Text
Dr Leonard Wee
Maastricht University Medical Centre

**LIFE SCIENCES & EHEALTH**

**CARRIER**
Coronary Artery Disease: Risk Estimations and Interventions for Prevention and Early Detection
Dr André Dekker
Maastricht University Medical Centre

**HUMANITIES & SOCIAL SCIENCES**

**TICCLAT**
Text-Induced Corpus Correction and Lexical Assessment Tool
Dr Martin Reynaert
Tilburg University

**HUMANITIES & SOCIAL SCIENCES**

**Understanding Visually Grounded Spoken Language via Multi-Tasking**
An Alternative Approach for Intelligent Systems to Understand Human Speech
Dr Grzegorz Chrupata
Tilburg University

**SUSTAINABILITY & ENVIRONMENT**

**Detecting Anomalous Behavior in Stadium Crowds**
Location Analytics Based on Data Collected with Wi-Fi and Bluetooth Sensors in the Amsterdam ArenA
Prof. Sander Klous
University of Amsterdam
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Scientific impact

Our team of eScience engineers collaborates with researchers from a broad range of disciplines. In 2019, we kicked off public-private projects in the area of big data and health, and earth observation. Calls were also launched for the collaborative projects eTEC-BIG, ESI-far, CORTEX and the EU-funded projects ESIWACE/ESIWACE2.
Moreover, we achieved a number of milestones in our first Flagship project, eWaterCycle II, including an extension of the eWaterCycle platform to an online platform and a Lorentz Center workshop that brought together 29 leading scientists from 7 different countries.

In addition to key numbers, the following section includes three features on projects the eScience Center is currently involved in.

- **96** Papers published
  - 78 journal articles, 18 conference papers
- **49** Project proposals received
- **11** Jointly funded projects
11
Completed projects

28
Blog posts
As the national center of excellence for the development and application of research software, the eScience Center and its engineers are strongly committed to sharing the latest knowledge and professional insights in the field of eScience. Our engineers regularly take part in debates on current and future developments in research and digital science by organizing or attending conferences, but also by publishing in the public domain. Below are three recent blog posts by our engineers.
Blog posts

MAY 29, 2019
Some thoughts about developing software for scientific applications
Felipe Zapata
Read article

JUN 12, 2019
Can we have explainable AI or are we entering an infinite loop?
Sonja Georgievskas
Read article

JUL 15, 2019
King – Man + Woman = King?
Florian Huber
Read article
Research software

Software has become an integral part of academic research. The Research Software Directory is one of the primary ways the eScience Center aims to encourage the re-use of software across disciplines. Since its launch in 2018, the RSD and its underlying infrastructure have been made available open source to partners and researchers as a way to ease the findability, scientific referencing and reproducibility of research software.

103
Software packages in the RSD as of December 2019

38
Organizations co-developing our software

87
Software packages with a DOI
97% Projects based on free and open source software code

167 Scientific publications linked to the software

32 Unique mainstream media publications

346 Citations of our software packages

Feature news
Promoting open science through the Research Software Directory

Read a recent interview with Jurriaan Spaaks, eScience Research Engineer and co-developer of the Research Software Directory, on the value of the RSD and how it promotes open science.

Read article

FAIR Software website

The Netherlands eScience Center and Data Archiving and Networked Services (DANS) recently launched a new FAIR Software website for researchers.

Read our press release
Networking and dissemination activities

In 2019 we organized several activities and our annual National eScience Symposium to promote eScience in the Netherlands. Below some highlights.
NWA Matchmaking: VWData Symposium

On 18 March, we co-organized the VWData Symposium 'AI, AI, AI: of Value and Vigilance'. The symposium featured several inspirational keynote speakers, including Prof. Janneke Gerards (Professor of Fundamental Rights, Utrecht University) and Hans Bos (National Technology Officer, Microsoft Netherlands). Project leaders from the VWData Program presented their latest findings and showcased live demonstrations and project videos. This was followed by an open and plenary debate among all symposium participants.

Principal Investigator Day: Sharing Expertise Enhances Collaborations and Advances Research
On 19 April, the annual Principal Investigator Day took place at the Johan Cruijff ArenA. This event brought together PIs and eScience research engineers to share knowledge and expertise. The open atmosphere and breakout sessions stimulated in-depth discussion on the scientific challenges and the contributions of the eScience Engineers in each domain.

National eScience Symposium 2019

On 21 November, we held our 6th National eScience Symposium at the Johan Cruijff ArenA, Amsterdam. Titled “Digital Challenges in Open Science”, the event drew more than 250 participants and featured 10 interdisciplinary sessions on the challenges and opportunities of open science in domains such as health and life sciences, the humanities and social sciences. The event also saw the launch of a new FAIR Software website and the announcement of the Young eScientist Award 2019.
NL-RSE 2019

As an important backer of the Netherlands Research Software Engineering community (NL-RSE), we helped to host the first NL-RSE19 Conference to take place in the Netherlands. The event, held at the Johan Cruijff ArenA on 20 November, brought together research software users and developers to share knowledge, organize new initiatives and raise awareness for the scientific recognition of research software.

Read more

Young eScientist Award 2019

Lise Stork was announced winner of the Young eScientist Award 2019 during the 6th National eScience Symposium on 21 November. Stork, a PhD researcher at Leiden University’s Institute of Advanced Computing, was selected for her research in developing software tools to help researchers analyze large datasets.
Workshops and trainings

As the national center of excellence for the development and application of research software and methodologies, we place great importance on sharing eScience knowledge and expertise with the outside world. As such, we regularly organize trainings and workshops in areas such as machine learning, software development and programming. In 2019 we continued to build on these efforts by (co)organizing ten events.
Presentations

Besides organizing events, our engineers actively participate in local and international scientific events by, for example, giving keynote presentations, taking part in panel discussions and meetings, managing workshops or highlighting our expertise and activities. Some of the major events we attended in 2019 include the Astronomical Data Analysis Software & Systems Conference, the Digital Humanities Conference, Earth Observation, Science & Society Symposium, SuperComputing 19, SURF Super Day, PLAN-E workshops in Rome and Lund, the ePLAN workshop on Computational Science and Physics@Veldhoven 2019.
Facts and figures

Budget

The majority of our budget is directed towards funding and conducting projects. In those projects we connect the world of scientific questions and research challenges from domain sciences with the world of data and computer sciences and digital infrastructures. We want the knowledge and tools we develop in these collaborations to be open to the academic community – part of our budget is therefore directed towards coordination activities, the development of the Research Software Directory and encouraging the re-use of research software through workshops.

Total budget: EUR 6.3 million
Upcoming projects

Energy System Integration ESI-far (deadline proposals June 2020)
ESiWACE2 Service 1

Projects awarded funding from these calls will start in 2020. For the latest information visit our [project page](#).