01 January-30 June 2017: Six-Month Interim Report

Summary
The first half of 2017 has been a significant period for Amsterdam Data Science (ADS) with many key goals achieved. Our network organisation has continued to grow with new knowledge institutions joining, collaborations with industry established, and a broadened international network. This report summarises our continued growth and our heightened involvement within the Amsterdam region (our 2016 report can be viewed here: https://tinyurl.com/y77y6bhe). We also update on highlights of the Amsterdam Academic Alliance Data Science (AAA-DS) programme, as we move closer to unifying into one joint initiative.

2017 highlights (to date, in brief)
- New collaborations with Bosch (Germany), Insight (Ireland), the Police (NL), Tsinghua (China)
- Launch Event of the Amsterdam School of Data Science (March 2017, 400+ attendees)
- Launch of the new Amsterdam Data Science Minor (starting September 2017, course full)
- Triple increase in enrollment numbers for the Data Science Master Track
- Series of 7 articles in 'Het Financieele Dagblad' on ADS collaborations with Elsevier, Tata Steel, Qualcomm, Sandd, Philips and Databricks
- Hosted 20 Meetup Events for students, researchers and industry experts on a broad range of data science related projects

Who we are
ADS is a network organisation initiated in 2013 by the Amsterdam-based knowledge institutes: Amsterdam University of Applied Sciences (AUAS), Centrum Wiskunde & Informatica (CWI), University of Amsterdam (UvA), and Vrije Universiteit Amsterdam (VU). ADS comprises over 600 scientific staff, at all levels, for example:
- **Master students** who spend a day a week on a specific ADS research project (9) (see project summaries here: https://tinyurl.com/y9jqc7pt);
- **PhD and Postdoc researchers** on specific AAA-DS projects (16) (see Table: https://tinyurl.com/y8meekd4);
- **Associate and full Professor** level researchers (over 80) from multiple research disciplines.

Our goal
ADS accelerates data science research by connecting, sharing and showcasing world-class technology, expertise and talent from Amsterdam on a regional, national and international level. Our research enables business and society to better gather, store, analyse and present data in order to gain valuable insights and make informed decisions.

Finance
In 2017, each official ADS partner: *Faculty of Digital Media and Creative Industries (AUAS); CWI; Informatics Institute (UvA); Amsterdam Business School and Amsterdam School of Economics, Faculty of Economics and Business (UvA); Department of Computer Science (VU); Department of Mathematics, Faculty of Economics and Business, Amsterdam Center for Business Analytics (VU),*

contributes 10K in cash and 40K in kind. Over the course of the year, the cash contributions from the partners are used to support project staff (project management and business relations), hosting of regular seminars and events, and the ADS website and marketing costs. This is both for Amsterdam Data Science and the Amsterdam School of Data Science (our education platform).

Within ADS, there is also the AAA funding stream, this is a joint data science initiative of UvA and VU, aimed at intensifying collaboration with each other and other Amsterdam knowledge institutions (AUAS, CWI, VUmc) and industry (ORTEC and Philips). The AAA-DS projects are unique in that they span multiple research domains (business, humanities, informatics, life sciences and social sciences), faculties and universities. There are 12 postdocs and 4 PhD students, each on a specific data science project within this 3-year programme. Table (https://tinyurl.com/y8meekd4) summarises each AAA project with one highlight from the last 6 months, one highlight since the start of the project, and plans for the next 6 months. In brief:

- **3.069K** was the original funding amount awarded by the UvA and VU CvB.

In addition to this original amount the following has been secured:

- **1.255K** for AAA projects with ABS, AUAS, CWI, Philips, ORTEC and VUmc;
- **4.272K** in NWO grants to AAA researchers for project collaborations with Ahold Delhaize, Beeld en Geluid, Elsevier, and KNAW;
- **8.596K** in total cash injection to the AAA programme.

2017 highlights (in detail)
Establishing new partners

New knowledge institutes join ADS: In January 2017, the Department of Mathematics, Faculty of Economics and Business, Amsterdam Center for Business Analytics (ACBA) of the VU all joined ADS. This partnership has already led to new projects being set-up, specifically in the domains of HR and big day analytics.

New ADS labs: Since the start of the year two new ADS Labs that have been launched which host **over 20 joint PhD and postdoc positions** between the University and the respective company:

- **DELTA**: A collaboration with Bosch on deep learning in the automotive industry and computer vision
- **Police**: Using computer technologies to gain information from seized mobiles and computers

New international collaborations: This year already we have set-up new collaborations with Insight (data science research centre Ireland) and Tsinghua University (China). These new collaborations will focus on joint research projects, education, and student and staff exchange.

Strengthening the Amsterdam knowledge institutions collaborations

AAA-DS: UvA hosts 8 positions and VU also 8, with the individual positions bridging universities, thus maximising collaboration opportunities. Eight positions span research domains (e.g., informatics/social sciences, business/informatics) and 2 involve local industry partners (ORTEC, Philips). AAA-DS also partners with other key Amsterdam academic partners: AUAS, CWI and VUmc.

Research assistants: ADS has enabled 9 research assistant projects, where Master's students spend 1 day a week on a specific project, with each individual project spanning either two knowledge institutes (AUAS, CWI, UvA and VU), or partnering with local industry (Dagblad De Correspondent), or a startup (CTcue). These represent new collaborations that would not exist without the ADS funding.

Linking with related data science initiatives

Responsible Data Science (RDS): ADS researchers are key members of the RDS collaboration of 11 knowledge institutions across the Netherlands. Under the RDS theme, at Amsterdam we have coordinated 5 Meetup events this year, with speakers attending from across the Netherlands to present at this event. This has enabled this important topic to receive greater attention as evidenced through the recent VSNU call.

Promoting data science education in Amsterdam
Amsterdam School of Data Science: In March we held the launch event of the School, an umbrella term to encompass the data science education offering from the Amsterdam knowledge institutes. The event was opened by the deputy mayor of Amsterdam and the high interest was evidenced by the turnout of over 400 attendees. The School website is a platform for all course and programme options in data science and at all levels: Bachelor, Master, Postgraduate and Professional/Executive education (200+ courses and programmes). In this initiative, ADS have intensively marketed Amsterdam's strong position in terms of data science study to the external community.
Master - Data Science Track: ADS researchers have been actively involved in teaching this successful track and its development for the second year. Enrollments for year 2 have increased significantly from 35 (year 1) to 100+.
Minor - Amsterdam Data Science: ADS researchers have set-up a new minor (beginning September) to meet the high demands of those wishing to study data science. The minor has received significant interest since its launch and was over-subscribed very quickly. The minor is a joint collaborative effort of the Amsterdam knowledge institutions and will equip students with the skills to enrol in the data science master track.
Education awards: Amsterdam School of Data Science has recently been nominated for the Computable Awards ICT Educator of the year. The outcome of which is due in October.

Disseminating our research to the outside world
Events: We have two active local Meet-up communities with over 4,500 members. We organise seminars and events (2 or 3 each month), which is an opportunity for our researchers to showcase their projects to key stakeholders. In 2017 we have already hosted over 20 events, with between 100 and 250 attendees at each event. We also invite external speakers to present and have had speakers from various Universities in Europe and the U.S. and speakers from industry including Microsoft and Amazon. In June we hosted an event for 18 Amsterdam-based data science startups, with the aim to pitch in particular to our student community.
Communication: We circulate a monthly newsletter, which is mailed to our internal and external community (over 600 subscribed), to highlight our research further and enhance its reach. We include research highlights, upcoming events and calls in the newsletter. Besides we also have a twitter account, linkedin company page and a facebook page as communication channels.
Press: A series of seven weekly articles in 'Het Financieele Dagblad' on ADS collaborations with Elsevier, Tata Steel, Qualcomm, Sandd, Philips, Databricks, plus a summary article, were released at the start of 2017, which attracted great attention for the ADS research.
The Police Lab has attracted a lot of attention and even made it to the national news of NOS and other media channels.

Further information
Amsterdam Data Science
http://amsterdamdatascience.nl
info@amsterdamdatascience.nl
https://www.meetup.com/Amsterdam-Data-Science/
https://twitter.com/ams_ds
https://www.linkedin.com/company-beta/10548382
Amsterdam School of Data Science
https://www.schoolofdatascience.amsterdam
info@schoolofdatascience.amsterdam
https://twitter.com/AMS_DataSci
https://www.facebook.com/amsterdamschoolofdatascience/

For the second half of 2017 and beyond

Foundation: A key goal in 2017 will be for ADS to become a foundation so that there is finance available to ensure long-term sustainability.

Education: We will investigate innovative teaching and online education possibilities through the Amsterdam School of Data Science.

Regional and international network: We will continue to build and expand our collaborations, for example through exchange programmes with Insight Ireland, Tsinghua and Wuhan.

ADS strategic directions 2018-2022: We have recently finalised the ADS directions for the next 5 years. The focus areas encompass Research, Education and Entrepreneurship. ADS Research will have a focus on: Foundations of Data Science, Health and Life Sciences, Digital Business, City Analytics and Responsible Data Science.

Foundations of Data Science

- **Data management systems architectures**: To facilitate large-scale data analysis for statistical data and the analysis of network structures
- **Knowledge-driven analytics**: To use reasoning frameworks and process analytics to study reproducible results for a wide range of data-driven problems in business and science
- **Machine learning foundations**: To determine the quantity of data needed in order to reach concrete conclusions, with a specific focus on health
- **Models** and **techniques** for analytics: To address big data variety and veracity challenges
- **Sustainable systems** and **software architectures**: To build, monitor and analyse complex, scalable interacting systems for commercial and communication problems

Health and Life Sciences

- **Bioinformatics**: To use data science techniques to study low-level molecular and high-level behavioural problems in a wide range of applications
- **Deep learning and** health: To use deep learning techniques in the medical imaging domain through the new AML4Healthcare Research Lab
- **Digital health**

Digital Business

- **Big data analytics**: To investigate innovative ways for organisations to create real value from (big) data and analytics
- **Business model innovation**: To find new innovative ways to create and appropriate value
- **Data Science in business**: To bring data science technology to all functions of businesses (e.g. finance, HR, marketing, supply chain)
- **IoT**: To enable business to get insights from sensor data
- **Human resources analytics**: To enable businesses to improve and innovate through better insights on talent acquisition, workforce planning, and employee retention
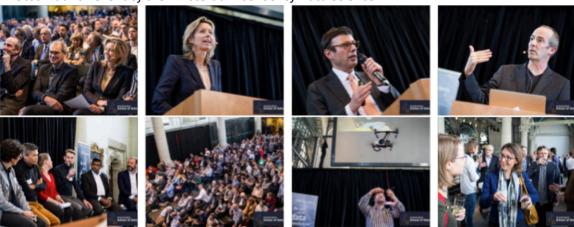
City Analytics

- **Urban analytics**: To apply data science techniques to data from the City of Amsterdam on observations (e.g. traffic streams), interviews and questionnaires
- **Urban well-being** and **citizen empowerment**: To develop data-driven solutions with a predictive and preventive focus on well-being as a system of interactions and events

Responsible Data Science

- **Fairness, Accuracy, Confidentiality,** & **Transparency** (FACT): To future-proof responsible data science methods research is needed focussing on FACT. The methods developed will be inspired by questions from business, government, health, and science
- **Ethics**: To explore ethics in relation to society and business further
- **Security**: Development of systems to secure privacy

Photos: *Launch event of the Amsterdam School of Data Science*

ADS researchers visit Tsinghua to discuss collaborative research and staff and student exchange

ADS and Insight Ireland sign agreement for joint research projects