

**Research Visitation Computer Science 2009-2014
Leiden Institute of Advanced Computer Science
Leiden University**

Commentary and Reaction by LIACS

LIACS is pleased with the report of the visitation committee, which paints a fair picture of our research accomplishments.

After a few quotes from the findings by the committee, we will provide a reaction to their recommendations.

The committee awarded the following scores to Computer Science in Leiden:

- Research quality: 2
- Relevance to society: 1
- Viability: 2

(1 is world leading/excellent, 2 is very good, 3 is good, 4 is unsatisfactory)

The committee finds that:

- [the] overall research theme [of LIACS] is data processing and data modelling
- [LIACS has a] tight research profile based on tight combination of fundamental computer science research [...] all groups in LIACS have been focused on one common research theme, which is “Data Processing and Modelling”. For a relatively small institute a niche strategy with such a clear focus on data analytics for the biosciences is a clear advantage in the global competition for excellence. The committee was also pleased to note that all research groups at LIACS develop a solid mathematical foundation of their work.
- An average of 40 journal publications and about 100 peer-reviewed top-level conference papers is a very good research output, given the small size of the scientific staff with only 9.2 FTE.
- The committee was surprised that in 2014 only 85K EUR have been invested in the research infrastructure. This is definitely too low for a computer science department, that is competing with the best worldwide.
- LIACS has a lean and efficient management structure with a scientific and an education director seconded by an administrative director. LIACS has managed to strengthen its focus considerably: data science for the biosciences. All new recruitments have been aligned with this common goal. The existing staff had either to adapt their research area or they were successfully outplaced to other universities or industry. This was a bold and visionary decision, but the committee believes that with the limited resources available, this was the appropriate strategy to remain a leading computer science department.

Reaction

LIACS is pleased with the report of the visitation committee, which gives a fair perspective on our research. Indeed, LIACS has chosen as strategy to focus on data in

general, and on life science in particular, based on a sound grounding in fundamental computer science. The committee concurs with our strategic choice, deems it smart and forward looking, and appropriate for the size of the institute. The committee awards scores of 2-1-2 for research quality, relevance to society, and viability. We wish to stress that, in general, LIACS is pleased with these scores, especially with the score of “Excellent/World Leading” for relevance to society of our focus on data and the life sciences. The scores reflect our commitment to research and to society, while spurring us on for future improvement.

The committee has recommendations which we group in the following list of seven items:

1. keep research focus on data science/health/fundamentals
2. increase investment in research infrastructure
3. keep producing research papers, and create more systems/tools
4. more external funding, reduce teaching load, more ERC starting grants
5. strategic alliances with industry, more spin-off companies
6. increase number of full time full professors
7. reduce drop-out rate of PhD students

Smart follow up actions

LIACS is grateful to the committee for their recommendations. LIACS has developed the following actions to address the recommendations. As much as possible, we have kept this as SMART (Specific, Measurable, Acceptable, Reasonable, Timebound).

1 Research Focus

As one of the driving institutes of data science research in Leiden, LIACS will increase its commitment, and support and develop new initiatives to strengthen data science. In health, we will do so via existing collaborations with: statistics, biology, environmental sciences, the hospital, pharmacy, psychology and bio-informatics, and data science in Delft. In fundamentals we will increase collaborations with physics, astronomy, humanities and governance. We have many international collaborations. We work with Leiden University and the Faculties to strengthen research in data science through a research program for data science. Through these programs, and through research collaborations, we aim to increase the number of data science PhD students substantially.

Our research focus fits well with the following National Science Agenda (NWA) exemplary routes: Personalized Medicine, Smart Industry, Smart Cities, Responsible Big Data, Behavior, Origin of Life, Fundamentals of Matter, Circular economy, Logistics.

Research in Leiden is strongly related to teaching. Together with the Leiden Mathematical Institute Statistics section a joint data science Master specialization has been realized. Our goal is 30 Master students in this specialization by 2020. The Bachelor Computer Science & Biology will be strengthened to attract more students. The attractiveness of the existing core computer science bachelor and master offerings will be improved with new and updated courses. Our goal is to maintain the current (moderately high) level of Bachelor and Master students and to keep improving quality.

2 Increase Investment in Research Infrastructure

LIACS has increased its investment in its own research infrastructure. The increase in data science research, analysis and machine learning has increased the need for research compute/analysis capacity. A recent inventory of High Performance Computing use at Leiden University has shown the need for increased investment on a University wide scale. Together with the other users, LIACS is leading this development. By the end of 2015, a state of the art compute, analysis and visualization facility has been realized as a new lab. LIACS is also active in the creation of the data management strategy for our university and our research projects.

3 Research Output

The committee notes the high quality of papers of our research output, and suggests to increase our activity in producing software systems. Although we are already involved in many open source software efforts (for example: MIRFLICKR, OpenML, FORM, VMO, MACSDVRP, MonetDB), we will work to supplement our current systems in embedded systems and workflow systems, with systems in visualization, imaging, data analytics, pattern recognition, and decision support systems in health and industry. To do so, we strengthen the lab structure of our research groups, with computer hardware, and with analyst/programmers.

4 Funding/ERC/Teaching Load

The committee suggests to increase our external research funding, and especially our ERC grants. While keeping the existing good record in joint industry grants, LIACS will work to improve personal (VVV/ERC) grants of the staff. Resources will be allocated to support the writing of successful proposals. While our full time research staff is limited in size, we aim to significantly increase the number of personal grants. The teaching load will be re-assessed to allow for more time for grant-writing.

5 Alliances and Spin-offs

Through many of our research grants, LIACS has built up industry relations with a range of sectors, from health to maritime to automotive to space. We aim to nurture and expand these industry alliances. We plan to organize a yearly industry-relation event (symposium). The NWA routes Personalized Medicine, Responsible Data, Smart Industry, Smart Cities, Sports, and Logistics offer excellent opportunities for industry alliances. A fair number of our students are actively starting up spin-off companies. LIACS supports these spin-offs in collaboration with the Leiden Knowledge Exchange Office and HUBSpot Incubators. Where students are starting up companies before their graduation, LIACS will try to carefully balance more graduates versus more spin-offs.

6 Number of Full Time Full Professors

The committee notes that the number of full time full professors of LIACS is small and suggests to grow this number. LIACS agrees, and will actively work on attracting more full time full professors through external hires and through internal promotion. Furthermore, while our junior personnel are relatively diverse, we are actively scouting for more diversity in our senior personnel and are promoting diversity

throughout the institute. While keeping an eye on budgetary constraints, our aim is to organically grow the number of full time full professors until 2020.

7 Success Rate PhD Students

LIACS produces a good number of excellent new PhD's every year. LIACS has a relatively high number of external PhD students, which explains some of the findings by the committee. Furthermore, we aim for quality. In general, a downside of going for the highest quality may be a higher drop-out rate. LIACS will further strengthen quality procedures to ensure that all PhD students receive excellent supervision. More cross-group meetings will be held. On the hiring side, the level of scrutiny in hiring procedures will be increased. We aim that our PhD success rate will exceed the national level, both in quality, minimum drop-out rate, and short duration.

In conclusion

We thank the committee for their concrete and constructive recommendations. Implementing them will allow LIACS to grow in research quality and viability, to maintain its world leading relevance to society, and to be a fun place for computer science! We look forward to making this happen.