


## ANNUAL REPORT ScITS 2019



Science IT Support  
Mathematical Institute  
Phil.-nat. Faculty

## 1. Summary

In 2017 the Faculty of Science seeded the formation of the Science IT Support (SciTS) within the Mathematical Institute with strategical funds. A multidisciplinary team from computer science, mathematics, life sciences and physics with various digital competences serves as an interface between the faculties' research, local, national and international e-Infrastructures and high level computing facilities. SciTS follows three lines of strategy: *Research and Support, Training and Education* as well as *Development*.

In 2019 SciTS has conducted **20 research and support projects**. It organised **44 training courses with more than 700 registered participants**. It also conducted the second run of the CAS Applied Data Science and designed the **CAS Advanced Machine Learning** to start in 2020.

The collaboration with the Microscopy Imaging Centre (MIC) continued in 2019 with excellent relationships. SciTS has also been in close contact with the project "Competence Network for Digitalisation" and is considering how to collaborate with this new initiative. Nationally SciTS initiated the establishment of the **EnhanceR Association**, an interest organisation for Swiss research IT expertise with 11 Swiss higher education and research institutions as members. The association starts its work in 2020 under the presidency of the SciTS coordinator and with the University of Bern voting member from the Central IT (*Informatikdienste*).

The return of the faculty investments has increased steadily. In 2019 the funds attracted by SciTS reached 490 kCHF. Related to the the faculty seed funding of 100 kCHF per year, **this amounts to a 390% return**. The seed funding is exclusively used to fund 50% of the SciTS coordinator position.

In 2020 the main challenge for SciTS will be to pursue the establishment of a sustainable core funding. The funding opportunities from seed and project instruments are close to exhausted and sustained sources are increasingly expected from SciTS stakeholders. **Core funding is mandatory as most relevant funding agencies do not allow for PI and project leader funding**. Currently the SciTS seed funding is very low compared to other research IT units in Switzerland.

The year 2019 again exceeded our expectations substantially and we strive for increased engagement with more research groups in 2020 and additional support from central university organisation.

PD Dr. Sigve Haug  
SciTS Coordinator

Prof. Dr. Christiane Tretter  
Mathematical Institute Director

## 2. Research and Support Activities 2019

In 2019 ScITS conducted **20 projects with research groups in 3 different faculties**. 12 research support projects were related to the Microscopy Imaging Center (MIC) for which ScITS provides a dedicated imaging expert. In Table 1 the projects are listed with titles, principal investigators, institutes and types of output.

**Table 1:** The 20 ScITS projects in 2019.

Project Title	PI	Institute	Output
Applying CARE for 3D image enhancement	Olivier Pertz	ICB	Software
Synapse detection	Volker Enzmann	DBMR	Software
Segmentation of gold particles in EM images	Achim Stocker	DCB	Python software
Nuclei detection in live microscopy	Britta Engelhardt	TKI	Software
Segmentation of bacterial colonies on agar plates	Isabel Roditi	ICB	Software
Measuring cell border length in fluorescence m...	Britta Engelhardth	TKI	Fiji script
Analysis of cytoskeletal assembly in live cell...	Olivier Pertz	IZB	Software
Segmentation of nuclei in Drosophilia whole gu...	Beat Sutter	ICB	Fiji script
3D segmentation of mitochondria in SBFSEM	Smita Saxena	DBMR	Ilastik/deep learning pipeline
3D nuclei counting and spot detection for in s...	Horst Posthaus	VetSuisse	Fiji script and Python software
Cryo-injury detection by DL	Nadia Mercader	ANA	Software
Digital Lives (SNSF)	Heike Meyer	GIUB	Publications, data and code
CAS Advanced Machine Learning	Sigve Haug	MAI	Study Program
Science IT Support	Olivier Pertz	ICB	IT Infrastructure
Laboratory Informamation Management System	Olivier Pertz	PhilNat, Med	IT Infrastructure
Science IT Suppprt CSH	Kevin Heng	CSH	IT Infrastructure
EnhanceR	Sigve Haug	Multiple	Multiple
eScience Certificate Authority	Alexander Kashev	ID, LHEP	eScience Identities
EGI Central Operation	Gianfranco Sciacca	ID, LHEP	IT Infrastructure
Swiss EGI Representation	Sigve Haug	Multiple	IT Infrastructure

One infrastructure project worth mentioning, Laboratory Information Management System for Life Sciences at UNIBE, was pursued together with the Institute for Cell Biology (IZB/ICB) with support from the the Faculties of Medicine and Science. A platform solution **openBIS** from ETHZ, suited for *wetlab* environments, was introduced to several groups. A second infrastructure project was the introduction of a research facility management and booking system

**Open-IRIS** together with MIC. A challenge related to the introduction of new infrastructures is the sustained funding model. ScITS don't have core resources for maintaining infrastructures.

In 2019 ScITS partnered in a successful SNSF proposal "Machine learning for detecting compound climate drivers of extreme impacts" together with Jacob Zscheischler and Fortunat Joos from Climate and Environmental Physics, Olivia Romppainen-Martius from the Institute of Geography. As a result and according to its current strategical focus on applied machine learning, ScITS employs a machine learning postdoc till end 2021.

### 3. Training and education activities 2019

"Hilfe zur Selbsthilfe" is a fundamental part of ScITS' strategy for supporting research at the Phil.-nat. Faculty and the university as a whole. In the long term, enhancing the skills of students and employees is more efficient than singular support actions. In 2019 ScITS extended its portfolio of crash courses ranging from basic Linux, usage of central IT infrastructures to machine learning and ethics for scientific programming and computing. The first edition of the **Bern Winter School on Machine Learning** was held in Hotel Regina in Berner Oberland with 24 participants (full). The use of Jupyter notebooks and the inverted class room format will be continued. In total ScITS organised in 2019 **44 courses with 764 registered participants, whereof the distinct count is 305** (see Table 1). All courses are maintained on the university Ilias platform, and increasingly additionally on GitHub. Linked lists are available on the ScITS webpages.

**Table 1:** ScITS Training trends. ScITS courses normally have a maximum of 24 participants.

Year	Courses	Registered Participants	Distinct Participants
2017	15	200	83
2018	30	506	232
2019	44	764	305
<b>All Years</b>	89	1470	550

Both external and internal experts are engaged as coaches. Course leaders from CSH, LHEP, Bioinformatics, Central IT (ID), Informatics (INF), Mathematical Institute (MAI), SCITAS EPFL and S3IT UZH, Intel, Amanox Solutions, SWITCH, [EGE.eu](http://EGE.eu), Fachhochschule Bern (FHB), HEIG-VD among others have contributed to the ScITS training program.

ScITS also completed the first run of the CAS Applied Data Science (12 ECTS *Weiterbildung*) with 11 students, of which 5 were externals. This CAS is a data science fundamentals offer for researchers and professionals from university, industry and administration. By law the CAS has to be financed by fees, however, a significantly reduced level is offered to University of Bern internals. **In 2019 the new CAS had 24 registrations (maximum)**, of which the majority are externals. ScITS has also, in close collaboration with Prof. Paolo Favaro (INF), designed a follow up program **CAS Advanced Machine Learning** which is in the ratification process and shall start in August 2020.

Table 2 shows the main beneficiaries of the ScITS education program. The affiliation statistics are based on email addresses as this is the only registered information about the participants.

**Table 2:** Distinct and total counts of registered participants versus affiliation based on email address. Doctoral students have an affiliation, but may use their student address, thus then being counted in the *students* category. The largest 45 of 73 affiliation numbers are shown.

	Distinct	Total		Distinct	Total		Distinct	Total
<b>students</b>	225	566	<b>csb</b>	5	19	<b>extern</b>	1	9
<b>gmail</b>	12	78	<b>ips</b>	8	19	<b>oeschger</b>	3	9
<b>izb</b>	18	77	<b>climate</b>	9	18	<b>vetsuisse</b>	6	7
<b>giub</b>	19	63	<b>irm</b>	3	17	<b>ipi</b>	2	6
<b>dcb</b>	15	47	<b>psy</b>	9	15	<b>unil</b>	1	5
<b>iee</b>	14	41	<b>itp</b>	9	14	<b>cde</b>	1	5
<b>aiub</b>	14	38	<b>lhcp</b>	7	13	<b>ibmm</b>	4	5
<b>space</b>	17	36	<b>ub</b>	5	13	<b>ifik</b>	5	5
<b>ana</b>	11	34	<b>ispm</b>	6	12	<b>web</b>	1	5
<b>inf</b>	9	30	<b>icloud</b>	1	12	<b>ikmb</b>	1	4
<b>iap</b>	14	29	<b>id</b>	11	11	<b>pyl</b>	2	4
<b>math</b>	5	29	<b>sandow</b>	1	11	<b>unifr</b>	3	4
<b>gmx</b>	2	21	<b>artorg</b>	3	11	<b>insel</b>	3	4
<b>geo</b>	9	21	<b>wti</b>	2	10	<b>issibern</b>	3	4
<b>dbmr</b>	12	19	<b>bioinformatics</b>	3	9	<b>bnm</b>	1	3

In total **there are 73 affiliations**. Within the Faculty of Science, Cell Biology (IZB) and Geography (GIUB) have the most participants. Outside the Faculty of Science, Anatomy and Department for BioMedical Research (DBMR) are the largest groups, both from the Faculty of Medicine.

Together with the *Forschungsstelle für Digitale Nachhaltigkeit*, ScITS conceptualised an **entry level Data Science course** for bachelor students as a teaching digitalisation measure. The purpose is to offer students basic programming, statistics, visualisation and data analysis skills at the start of their studies. The process is pending in the *Studienausschuss* of the Science Faculty.

In 2020 ScITS will pursue a *swissuniversities* funded project with the objective of establishing a **Swiss wide catalogue with training and education offers** regarding digital skills and open science from all higher education institutions. Initial partners in the project are University of Bern (leading house), Swiss Institute for Bioinformatics, University of Zurich and SWITCH.

Training and education offers, supplemented by reports and evaluations, are available on the ScITS webpage.

## 4. ScITS Development

In 2019 further measures were taken to improve the ScITS sustainability. At the end of 2019 ScITS had 4.1 FTE whereof 0.9 FTE bound to the self-financed continuing education activities and only 0.5 coordination FTE is covered by the strategical funding from the Faculty. Compared to the personal resources in research IT units of sister institutions, the ScITS manpower is modest. SIS at EHTZ peaks with more than 30 members, In the middle, Science IT at UZH has currently 13 members. ScITS has slowly exhausted the seed and strategical funding opportunities. A sustained and future ScITS operation will require core funding (30-50%), typically generating 300% or higher revenue (see Table 4). The financial sources and responsibility have to be clarified. In 2020 and 2021 ScITS will likely depend on further core funding bridges.

Nationally ScITS took over the leading house of the *swissuniversities* project EnhanceR with 8 sister institution partners and total subsidies of 1.5 MCHF from 2017 to 2020. To sustain the research IT expertise network in Switzerland, the project created the association EnhanceR ([www.enhancer.ch](http://www.enhancer.ch)) with 11 Swiss higher education and research institutions under the presidency of ScITS University of Bern. The association is the interest organisation for research IT towards national and international funding agencies.

## 5. Location and People

Location: Sidlerstrasse 5, office 227  
 Webpage: [www.scits.unibe.ch](http://www.scits.unibe.ch)  
 Email: [scits@math.unibe.ch](mailto:scits@math.unibe.ch)

Coordinator, research and  
 education liaison, director of

Studies (CAS): PD Dr. Sigve Haug (physicist) 100%  
 Science IT Support: Dr. Alexander Kashev (computer scientist) 100%  
 MIC Support: Dr. Guillaume Witz (life scientist, imaging expert), 100%  
 Event and Education Manager: Claire Dove (from 2019-09-01) 40%  
 Mathematics and Research Data  
 Management Support: Dr. Kinga Sipos (mathematician) 60%  
 Machine Learning Support: Dr. Mykhailo Vladymyrov (physicist) 10%

### External team members:

Distributed computing: Dr. Gianfranco Sciacca  
 GPU expert (CSH): Dr. Simon Grimm

## 6. ScITS Funding Sources 2019 (kCHF)

Table 4 summaries the funding sources and their contributions in kCHF to ScITS over the last three years. The numbers are not exact and a conservative estimate on the uncertainty is about 10 kCHF for each contribution. Income from the continuing education activities is not included. The trend is positive and the seed funding from the faculty clearly pays off.

**Table 4:** ScITS Funding sources and their contributions in kCHF.

Source	2017	2018	2019	2020
Faculty of Science	100	100	<b>100</b>	100
Internal Service Level Agreements	60	150	<b>340</b>	>240
External funds	90	80	<b>50</b>	>80
<b>Sum</b>	250	330	<b>490</b>	>420



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