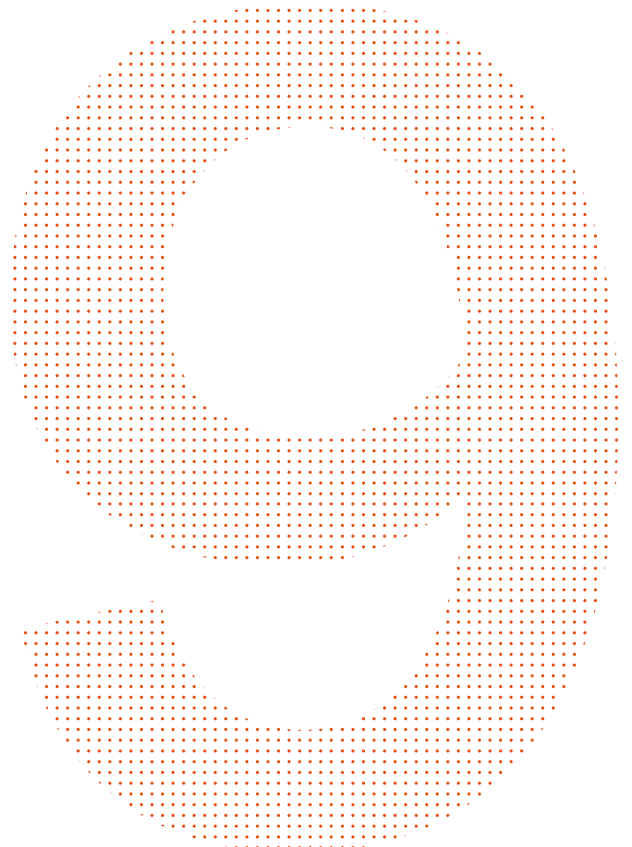
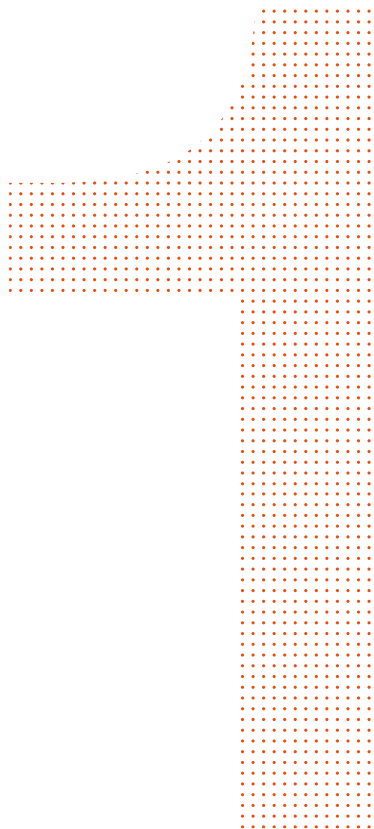
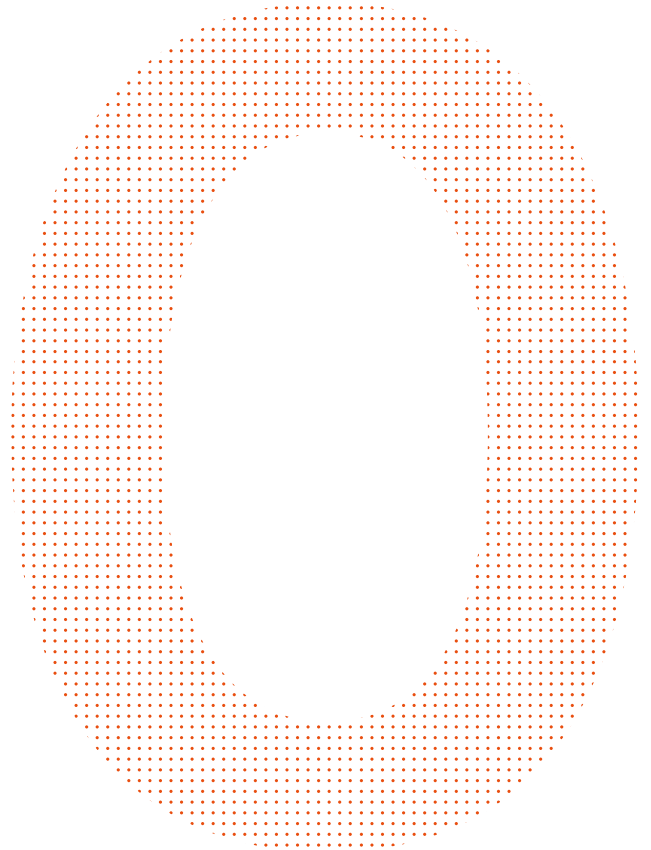
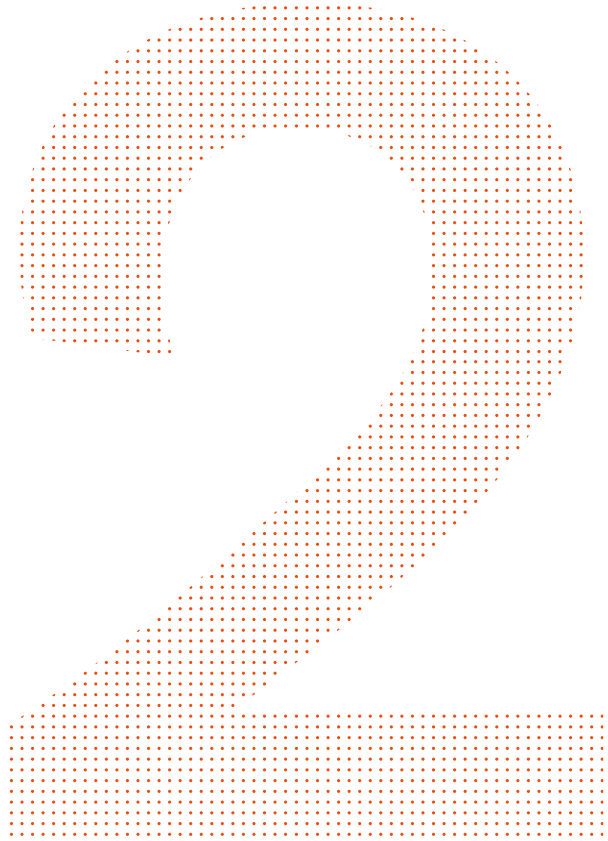


simula Annual Report





Simula Research Laboratory conducts basic and applied research and provides education in selected fields within scientific computing, software engineering, machine learning, communication systems and cybersecurity, thereby contributing to innovation in society. Simula is organised as a limited company and is owned by the Ministry of Education and Research.

The annual report includes the managing director's report, financial statements, publications lists, as well as the report on social responsibility and workplace environment. More information can be found at simula.no.

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Digitalisation: Simula is well positioned

Managing Director's
report



Professor Aslak Tveito
Managing Director

Digitalisation is all around and relieves us from a ton of horrendously boring work. Most of us have forgotten the pain of filling out tax return forms by hand, paying bills by posting cheque, writing letters by hand, or watching analog TV on only one channel. That era is well and truly over. We now enjoy a whole new way of life that continues to transform at increasing speed. Machines no longer require specific instructions for each operation they carry out; now they observe, learn and improve by the ancient method of trial and error. Consequently, they are becoming tremendously more useful, helping us solve serious problems – as well as some not-so-serious problems.

Digitalisation may sound like something very new but it is not. It started long ago when scientists observed that the main equations that modelled natural phenomena were too hard to solve by pencil and paper. Bear in mind this was not a conclusion researchers arrived at easily. The goal was to understand nature by understanding complex equations. Extremely elaborate techniques were developed to try to solve these equations, and solving such equations became a huge undertaking. Thousands of scientists were involved. It soon became clear that more realistic models of nature led to mathematical problems that were absolutely impossible to manage by hand. Exceedingly complex equations needed to be solved to produce interesting results but their very complexity had gone way beyond what is possible with human computation. Thus, the supercomputer was born.

When I wrote my Masters thesis in 1985, I solved a linear system containing 1,369 unknowns. That was considered challenging. Today, we routinely solve systems with hundreds of millions, if not billions, of unknowns. This may sound like a weird hobby, but it is at the core of science in the year 2020. In 1985, we assumed that an oil reservoir was a two-dimensional, uniform square. The human heart was also regarded as a two-dimensional square; nine billion heart cells were approximated using a linear system of 257 nodes (1987). The prevailing model of the brain consisted of a one-dimensional equation of amiable simplicity. Today, we can represent virtually any geometry or physical process on a computer, opening the door to tremendous new insights into how nature works.

The attempt to understand nature using pencil and paper has been replaced by mind-boggling numerical computations performed on enormously powerful computers. The main driver for this development has been the dramatic fall in cost for numerical computations¹. In 1961, doing one teraflop – that is one million million arithmetic operations – would cost you USD 160 trillion. Today, the cost of doing one teraflop is about USD 30 – a reduction by a factor of about five million million. In the last 20 years alone, the price has fallen by a factor of about 30,000. Although the development of large computing facilities started roughly 70 years ago, the application of such machinery in science and technology is still in its infancy and will continue to revolutionise all aspects of life.

As an organisation Simula is actually quite well positioned to benefit from this digital revolution. We host the national research infrastructure eX3, which provides a unique opportunity to experiment freely with bleeding-edge technology components that will be crucial for the next generation of supercomputers. We have a large group of researchers using the most powerful computers available to try to understand how the heart and brain work; from the scale of the individual protein to the entire organ. We have another group dedicated to understanding how to develop reliable software for critical systems, one that is focused on the ubiquitous problem of security and yet another that is trying to figure out how to establish extremely fast and reliable computer networks. Finally, a large and growing research focus at Simula is how we can use machine learning to solve important problems across a wide range of challenging applications.

¹ <https://en.wikipedia.org/wiki/FLOPS>

Report of the Board of Directors 2019

Simula's mission is to conduct fundamental long-term research in selected aspects of information and communication technologies, thereby contributing to lasting innovation in the business sector.

Now in its 18th year of operations, Simula Research Laboratory AS (SRL) and Simula Group achieved a turnover of NOK 150 million and NOK 236 million, respectively, in 2019 and a net result of NOK 10,9 million and NOK 42,1 million.



● From left: Aslak Tveito (Managing Director), Petter Nielsen, Hilde Brunvand Nordvik, Simon Funke, Mats Lundqvist, Ingvild Myhre (Chair of the Board), Katharina Ringen Asting, Pinar Heggernes, Ingolf Søreide. Not pictured: Elin Backe Christophersen

Administration and Organisation

SRL is registered as a limited company under 100% ownership of the Norwegian Ministry of Education and Research. The company combines academic traditions with recognised business management models. SRL is the parent company with five subsidiaries. Simula Innovation AS (SI) is wholly owned and manages SRL's investment portfolio, including shares in subsidiary Kalkulo, which was sold in 2019, and Simula Consulting AS. Simula School of Research and Innovation AS (SSRI) is owned jointly by SRL (72%), Equinor (14%), the Municipality of Bærum (9%), and Telenor (5%). Simula UiB AS was established in 2016, with SRL and the University of Bergen (UiB) owning 51% and 49%, respectively. Simula Metropolitan Centre for Digital Engineering AS (SimulaMet) was created in 2018, with SRL

and Oslo Metropolitan University owning 51% and 49%, respectively. Simula Consulting AS was established at the end of 2019 and is 100% owned by Simula Innovation.

The parent company and its subsidiaries cooperate closely. All are based in Bærum, with the exception of Simula UiB, located in Bergen, and SimulaMet located in the Bislett neighbourhood of Oslo.

Activities

Simula conducts important long-term research in networks and communication systems, scientific computing, software engineering, machine intelligence and cyber security. The research focuses on core challenges that combine technological development with utility value for industry, business and society as a whole.

Simula's research is published in international scientific journals and by leading scientific and technical publishers. In 2019, Simula's research featured in 88 articles in international journals, 1 book, 3 chapters in books and 83 peer-reviewed conference proceedings.

Over the course of 2019, Simula's scientific employees supervised nine doctoral candidates and 26 Masters students to successful completion of their degrees. From 2001 until the end of 2019, 133 doctoral candidates and 452 Masters students have been supervised at Simula. Over the summer of 2019, 24 summer interns were hired to work in various short-term projects.

The University of Oslo, which is an important partner, granted the majority of these degrees. Degrees have also been awarded by the University of Tromsø – The Arctic University of Norway, Kingston University London, KTH Royal Institute of Technology in Stockholm, the Norwegian University of Science and Technology (NTNU), TU Wien in Austria, the University of Bergen and Chalmers University of Technology in Gothenburg.

HSE – Personnel and Health, Environment and Safety

At the end of 2019, Simula Group had a total of 155 employees, with 138 in full-time positions and 17 working in part-time positions. Of these, 108 were men and 47 were women comprising 76 Norwegians and 79 foreign nationals. 65 people were employed as research fellows, with 26 postdoctoral positions and 39 PhD students. In addition, there were 26 external PhD students under the supervision of Simula researchers.

SRL had a total of 56 employees at the end of the year, with 49 engaged in full-time positions and 7 in part-time positions. Of these, 35 were men and 21 women.

Simula aims to maintain its strong focus on HSE. Absence due to illness was 1.2% for the Group and 1.0% for SRL in 2019. The Group will work actively to keep sick leave at continued low levels. There were no reports of occupational diseases or accidents during the year. HSE incidents are reported at each board meeting.

Simula's business activities do not pollute the external environment, beyond what is expected from a typical office business.

Equal Opportunities and Integration

The boards of SRL and SSRI earlier adopted an action plan that aimed to increase the proportion of female employees in scientific positions to 30% by 2017. By the end of 2019, the portion of female scientific researchers, meaning the average of PhD students, post-doctoral fellows and researchers in permanent positions, was 25%. The proportion of female researchers in permanent positions was 24%, and among PhD students and postdoctoral fellows, the portion was 23% and 31%, respectively. One of Simula's strategy goals for the 2018-2028 period is to increase the female proportion of the staff to 40% across the group by 2028 (as of the end of 2019, 30% of the entire staff were female).

Simula continues to work actively to improve the gender balance in the group through goal-oriented planning. In order to meet the target of 40% female employees by 2028, Simula will focus on initiatives to recruit talented female candidates, as well as develop and adapt work situations for qualified women already employed in the Group.

The Group also endeavours to fulfill the objectives of the Anti-Discrimination Act to promote equality, ensure equal opportunities and rights, and prevent discrimination in the workplace. There are 35 different nationalities represented in the Group, and 51% of the Group's employees come from outside Norway.

Simula offers courses in Norwegian, as well as social events and assistance with regard to visas, tax, living accommodation and other administrative issues.

Ethics

The Group follows ethical guidelines as described in "The Simula Code of Ethics". This also addresses research ethics, based on the fact that Simula is an institution dedicated to truth and the pursuit of truth. Simula's reputation is dependent on others being able to trust that research results are correct and have been produced in a verifiable and ethically responsible manner. In the event of questions regarding research ethics, Simula's researchers are required to adhere to the guidelines set by the National Committee for Research Ethics in Science and Technology (NENT). In addition, all employees must follow Simula's internal guidelines for scientific publishing, which are based on the Vancouver Convention.

Financial Risk

Simula is exposed to a certain amount of financial risk in connection with the Group's equity investments. The value of the shares portfolio is assessed continually, and should there be considerable insecurity connected to the value of investments, a write-down is performed. There is also some currency risk in connection with the European Union (EU) projects in which Simula participates. In total, the Board nevertheless considers the financial risk as low. The credit risk and liquidity risk are also low. The Board concludes that risks to the organisation are generally low.

Financial Performance

The Group had a turnover of NOK 236 million in 2019, an decrease of 4.5% from the previous year. Operating results were NOK 5.2 million, with a net result of NOK 42.1 million.

SRL AS had total revenue of NOK 150 million in 2019. External project funding totalled NOK 91 million. Net profit for the year was

NOK 10.9 million, which was transferred to other equity. Equity in SRL constitutes NOK 63 million, corresponding to an equity ratio of 50% of total assets.

Simula School of Research and Innovation AS (SSRI) had a total operating revenue of NOK 37.9 million in 2019, with a net result after tax of NOK -0,6 million.

Simula Innovation AS (SI) had a total operating revenue of NOK 2,2 million in 2019, with a net profit after tax of NOK 31.5 million.

The total operating revenue of Simula UiB AS was NOK 29.4 million in 2019, with a net profit after tax of NOK 4.8 million.

The 2019 operating revenue of Simula Metropolitan Centre for Digital Engineering AS (SimulaMet) was NOK 58.9 million, with a net profit after tax of NOK 7.5 million.

The shares in Kalkulo were sold in May 2019.

Future Development

The board believes that our annual accounts provide a correct picture of SRL AS and the Group. The Group is in a healthy economic and financial position.

At the end of 2019, Simula was participating in eight projects funded by the EU.

In accordance with section 3, paragraph 3a, of the Norwegian Accounting Act, conditions for continuing operations are confirmed present, and the annual accounts are prepared accordingly.

The Work of the Board of Directors

Simula's Board had four meetings and one seminar in 2019. The board would like to thank all employees for their strong contribution throughout the year.

Fornebu, 5 March 2020

Company overview 2019

Research

Simula Research Laboratory (SRL) AS

Managing Director: Aslak Tveito
Deputy Managing Director: Kyrre Lekve
Location: Fornebu
Ownership: 100% Norwegian Ministry of Education and Research

The six departments of the mother company primarily perform research and educate graduate students within the ICT fields of software engineering and scientific computing. Specific innovation activities, including the Simula Garages at both Fornebu and in downtown Oslo, are also managed by SRL.

Research departments:

Dept. of Computational Physiology
(ComPhy) *Dept. Head: Hermenegild Arevalo*

Data-Driven Software Engineering Dept.
(DataSED) *Dept. Head: Leon Moonen*

Dept. of Engineering Complex Software Systems
(ComplexSE) *Dept. Head: Shaukat Ali*

Dept. of High-Performance Computing
(HPC) – *Dept. Head: Xing Cai*

Dept. of Numerical Analysis & Scientific Computing
(SCAN) – *Dept. Head: Benjamin Ragan-Kelley*

Dept. of Validation Intelligence for Autonomous
Software Systems
(VIAS) – *Dept. Head: Arnaud Gottlieb*

Simula UiB AS

Director: Kjell Jørgen Hole
Location: Bergen
**Ownership: 51% Simula Research Laboratory,
49% University of Bergen (UiB)**

Simula UiB specializes in cybersecurity, conducts research and educates graduate students within cryptography and information theory. Simula UiB is owned by SRL and the University of Bergen (UiB), and is based at the Department of Informatics at UiB.

Research Sections:

Cryptography Section
Section Head: Håvard Raddum

Information Theory Section
Section Head: Eirik Rosnes

Simula is led by managing director Professor Aslak Tveito. Since the establishment of Simula Research Laboratory (SRL) in 2001, several subsidiaries have been established under SRL to organize its expanding activities in research, education and innovation. These companies are summarized below.

Education & Innovation

Simula Metropolitan Center for Digital Engineering (SimulaMet) AS

Director: Olav Lysne
Deputy Director: Marianne Sundet
Location: Oslo (Bislett)
Ownership: 51% Simula Research Laboratory, 49% Oslo Metropolitan University

SimulaMet is responsible for Simula's research activities in networks and communications, machine learning and IT management. In addition to performing research, SimulaMet also educates and supervises PhD and Masters students at OsloMet and contribute to innovation in society through collaboration projects, startup-companies and licensing of research results. SimulaMet is owned by SRL and Oslo Metropolitan University.

Research departments:

IT Management
Dept. Head: Magne Jørgensen

Mobile Systems and Analytics
(MOSAIC) *Dept. Head: Özgü Alay*

Machine Intelligence Department
(MIND) *Dept. Head: Evrim Acar Ataman*

Center for Resilient Networks & Applications
(CRNA) *Center leader: Ahmed Elmokashfi*

Holistic Systems Department
(HOST) *Dept. Head: Pål Halvorsen*

Simula School of Research and Innovation (SSRI) AS

Director: Marianne Aasen
Location: Fornebu
Ownership: 72% Simula Research Laboratory, 14% Equinor, 9% Bærum Municipality, 5% Telenor

SSRI educates tomorrow's ICT researchers and specialists at both Masters and PhD level in collaboration with both domestic and international academic institutions. SSRI also performs outreach and educational activities for both students and teachers in Bærum and Oslo municipality, including the Code School.

Simula Innovation (SI) AS

Director: Ottar Hovind
Location: Fornebu
Ownership: 100% Simula Research Laboratory

This is where research meets the practical demands of society – SI manages Simula's investment portfolio and supports entrepreneurs from the start-up phase and beyond.

Income statement

SRL		Simula Group			
2018	2019	Note	2019	2018	
Operating revenues					
175 124 295	149 595 621	Operating revenues	6	235 852 111	247 466 892
175 124 295	149 595 621	Total operating revenues		235 852 111	247 466 892
Operating expenses					
82 134 704	78 655 719	Salary and social costs	5	138 933 858	137 894 188
2 223 784	2 307 440	Depreciation	3	2 679 042	2 420 064
85 528 613	71 760 854	Other operating expenses		89 040 843	88 668 657
169 887 101	152 724 013	Total operating expenses		230 653 743	228 982 909
5 237 194	-3 128 392	Operating profit		5 198 368	18 483 983
Financial items					
94 559	164 999	Other interest income		387 759	218 701
79 551	14 112 635	Other financial income		38 565 391	1 887 100
0	0	Write-down of shares	12	1 668 420	2 598 557
93 744	20 868	Other interest expenses		44 404	106 552
453 975	190 667	Other financial expenses		242 847	504 342
-373 608	14 066 100	Net financial items		36 997 479	-1 103 649
4 863 586	10 937 708	Profit before tax		42 195 847	17 380 334
0	0	Tax	13	74 604	596 360
4 863 586	10 937 708	Net profit		42 121 243	16 783 974
0	0	Minority interests		5 820 960	5 876 724
4 863 586	10 937 708	Profit after minority interest		36 300 283	10 907 250
Allocation of the year's net profit					
4 863 586	10 937 708	Transferred to other equity			
4 863 586	10 937 708	Total allocated			

Balance sheet – assets

SRL		Simula Group			
2018	2019	Note	2019	2018	
Assets					
Fixed assets					
0	0	Deferred tax asset		0	5 425
0	0	Total intangible assets		0	5 425
Tangible fixed assets					
4 100 359	2 061 185	Furniture, fixtures, equipment	3	3 424 440	4 861 315
4 100 359	2 061 185	Total tangible fixed assets		3 424 440	4 861 315
Financial fixed assets					
30 032 351	35 097 351	Investments in subsidiaries	10	3 423 650	423 650
0	0	Loans to group companies		3 430 616	2 588 044
0	0	Investments in shares	12	42 799 289	25 685 717
0	0	Other receivables		3 000 000	0
30 032 351	35 097 351	Total financial fixed assets		52 653 555	28 697 410
34 132 709	37 158 536	Total fixed assets		56 077 995	33 564 150
Current assets					
Receivables					
12 490 211	15 775 405	Account receivables		24 129 521	13 605 063
26 453 644	31 536 422	Other receivables		29 239 001	51 877 185
38 943 856	47 311 828	Total receivables		53 368 522	65 482 247
Investments					
17 837 022	19 792 989	Market-based funds		19 792 989	17 837 022
17 837 022	19 792 989	Total investments		19 792 989	17 837 022
11 270 739	21 529 496	Bank deposits	9	92 411 563	58 336 579
68 051 617	88 634 313	Total current assets		165 573 073	141 655 848
102 184 326	125 792 849	Total assets		221 651 068	175 219 998

Balance sheet – equity and liabilities

SRL		Simula Group		
2018	2019	Note	2019	2018
Equity and Liabilities				
Equity				
Paid-in equity				
1 200 000	1 200 000	7, 8	1 200 000	1 200 000
1 200 000	1 200 000		1 200 000	1 200 000
Retained earnings				
50 848 363	61 786 071	8	107 936 950	76 742 663
0	0	8	19 062 762	13 380 866
50 848 363	61 786 071		126 999 712	90 123 529
52 048 363	62 986 071		128 199 712	91 323 529
Liabilities				
Provisions				
Other long term debt				
0	0	15	14 000 000	10 000 000
0	0		14 000 000	10 000 000
Current liabilities				
14 813 681	28 361 723		17 547 455	8 897 725
0	0	13	74 604	617 224
3 867 743	3 866 213		9 771 640	9 939 014
31 454 539	30 578 842		52 057 657	54 442 506
50 135 963	62 806 778		79 451 356	73 896 469
50 135 963	62 806 778		93 451 356	83 896 469
102 184 326	125 792 849		221 651 068	175 219 998

FORNEBU, 31.12.2019 / 06.03.2020

The Board of Directors

Ingvild R. Myhre Chair of the Board	Aslak Tveito Managing Director	Mats A. Lundqvist Board member	Pinar Heggernes Board member	Ingolf Søreide Board member
Hilde B. Nordvik Board member	Katharina R. Asting Board member	Petter Nielsen Board member	Wolfgang Simon Funke Board member	Elin B. Christophersen Board member

Notes to the financial statements

Note 1 Accounting principles

The financial statement have been prepared in accordance with the regulations of the Norwegian Accounting Act of 1998 and generally accepted accounting principles.

General rule for valuation and classification of assets and liabilities

Assets intended for permanent ownership or long-term use have been classified as fixed assets. Other assets have been classified as current assets. Receivables to be repaid within one year are classified as current assets. Similar criterias have been applied to the classification of current and long-term liabilities.

Fixed assets are valued at aquisition cost, but written down to fair value for any impairments that are not expected to be temporary. Fixed assets with a limited economic life are depreciated over the useful life of the asset. Long-term liabilities are recognised at nominal value in the balance sheet on the date they are incurred. Long-term liabilities are not revalued to fair value as a result of changes in interest rates.

Current assets are valued at the lower of cost and fair value. Current liabilities are recognised at nominal value in the balance sheet on the date they are incurred. Current liabilities are not appreciated to fair value as a result of changes in interest rates.

Certain items are valued according to other principles, as explained below.

Foreign Currency transactions

Assets and liabilities in foreign currency are translated into Norwegian kroner at the mid-rates quoted by Norway's National Bank on the balance sheet reporting day.

Tangible fixed assets

Tangible fixed assets are depreciated over the expected useful life of the asset. Depreciation is generally performed in a straight line over the expected useful life of the asset.

Receivables

Accounts receivables and other receivables are recognised at nominal value less provisions for anticipated losses from bad debt. Provisions for losses are based on an individual assessment of each receivable. In addition, if necessary, a general provision is made to cover expected losses on other receivables.

Tax

The company has not recognised tax expenses in the parent company's financial statements, since the operation is not considered to be liable for tax.

Revenue recognition

Revenues are recognised when delivery has taken place.

The Group

The consolidated financial statement comprises the parent company Simula Research Laboratory AS (SRL) and the subsidiaries Simula School of Research and Innovation (SSRI), Simula Innovation (SI), Simula Metropolitan Center for Digital Engineering AS (SimulaMet) and Simula UiB. Simula Research Incorporated is owned with 100% but is not included in the consolidated financial statements. The same goes for Simula Consulting AS, which had limited activity in 2019. Kalkulo AS, a subsidiary of SI, was sold in 2019. SRL increased its ownership in SSRI in 2019. The consolidated financial statements are prepared as if the Group were one economic entity. Transactions and balances between group companies are eliminated.

Note 2 Financial market risk and currency risk

The company is to a certain extent exposed to financial market risks, by investing in start-up companies. The currency risk the company is exposed to is mainly due to EU-funded research, and the collaboration with universities in the United States.

Note 3 Fixed assets

SRL

	Computer equipment	Furnishings, equipment, etc	Total
Fixed assets			
Acquisition cost as of 01.01	4 052 024	19 393 601	23 445 625
Additions	342 003	27 531	369 534
Disposals	208 027	-	208 027
Acquisition cost as of 31.12	4 186 000	19 421 132	23 607 132
Cumulative depreciation as of 31.12	-3 445 490	-18 100 457	-21 545 947
Book value as of 31.12	740 510	1 320 675	2 061 185
Year's depreciation	583 998	1 723 442	2 307 440

SRL Group

	Computer equipment	Furnishings, equipment, etc	Total
Fixed assets			
Acquisition cost as of 01.01	4 796 831	19 625 539	24 422 370
Additions	1 196 313	151 467	1 347 780
Disposals	208 027	-	208 027
Acquisition cost as of 31.12	5 785 117	19 777 006	25 562 123
Cumulative depreciation as of 31.12	-3 839 847	-18 297 836	-22 137 683
Book value as of 31.12	1 945 270	1 479 170	3 424 440
Year's depreciation	860 207	1 818 835	2 679 042

The economic life of operating assets is calculated as:

- Computer equipment 2-5 years
- Furnishings, fixtures & equipment 3-5 years

Note 4 Pensions

The Group has a duty to maintain an occupational pension scheme in accordance with the Mandatory Occupational Pension Schemes Act. The company's pension schemes fulfil the requirements of this legislation.

The Group has a pension scheme which covers all employees. The scheme entitles

members to defined future benefits. These are primarily dependent on the number of years of pension accrual, salary level at retirement and the size of the pension benefits received from the Norwegian National Insurance Scheme. The occupational pension scheme is financed through the build-up of funds in the Norwegian Public Service Pension Fund.

Note 5 Payroll costs, number of employees, remunerations, employee loans and auditor's fees

	SRL		Simula Group	
	2019	2018	2019	2018
Salary and social costs				
Salary	45 214 963	48 800 784	106 223 963	104 909 156
Social security	6 887 419	7 338 687	16 296 528	16 147 800
Pension costs	5 624 117	5 656 966	11 221 651	11 127 087
Other benefits	3 553 967	4 011 405	5 191 716	5 710 145
Contribution to cover cost of labour at SSRI	17 375 253	16 326 862	-	-
Total	78 655 719	82 134 704	138 933 858	137 894 188
Number of full-time equivalents	55	62	145	142
Remuneration paid to senior company officers	Managing Director	Board of Directors		
Salary	2 737 896	568 500		
Pension expenses	173 963	-		
Other remuneration	154 638	-		
Total remuneration	3 066 497	568 500		

No loans have been granted to, nor any guarantees made on behalf of, the Managing Director, the Board Chair or any other related parties. No loans or guarantees account for more than 5% of the company's share capital.

Auditor

The auditor's fees break down as follows:

Parent company:		Subsidiaries	
Statutory auditing services	112 000	Statutory auditing services	176 500
Other services	80 400	Other services	89 500
Total auditor's fees	192 400	Total auditor's fees	266 000

The auditor's fee is stated exclusive of VAT

Note 6 Operating revenue

	SRL		Simula Group	
	2019	2018	2019	2018
Research funding	55 973 000	54 595 000	70 973 000	69 595 000
Subsidies from the Research Council of Norway, EU, etc.	91 367 701	120 102 588	159 493 923	151 397 262
Other income	2 254 920	426 707	5 385 188	26 474 630
Total	149 595 621	175 124 295	235 852 111	247 466 892

Note 7 Share capital and shareholders

SRL			
Share capital:	Quantity	Face value	Book value
Ordinary shares	800	1 500	1 200 000
Total	800	-	1 200 000

The company's shareholders as of 31.12	Quantity	Shareholding
The Norwegian state represented by the Ministry of Education and Research	800	100,0 %
Total no. of shares	800	100,0 %

Note 8 Equity

SRL			
	Share capital	Other equity	Total
Equity as of 01.01	1 200 000	50 848 363	52 048 363
Profit/loss for the year	-	10 937 708	10 937 708
Equity as of 31.12	1 200 000	61 786 071	62 986 071

Simula Group

	Share capital	Other equity	Minority interests	Total
Equity as of 01.01	1 200 000	76 742 663	13 380 866	91 323 529
Change in equity as a result of access / departure	-	-5 105 996	-139 064	-5 245 060
Profit/loss of the year	-	36 300 283	5 820 960	42 121 243
Equity as of 31.12	1 200 000	107 936 950	19 062 762	128 199 712

Note 9 Bank deposits

	SRL	Simula Group
Restricted tax withholdings total:	2 077 947	4 808 640
Restricted bank deposit relating to leasing contracts total:	3 062 912	3 062 912

Note 10 Subsidiaries, associates, etc.

	Acquired	Office	Country	Shareholding
Simula Innovation AS	04.05.2004	Fornebu	Norge	100%
Simula School of Research and Innov. AS	08.05.2007	Fornebu	Norge	72.3%
Simula UIB AS	17.12.2015	Bergen	Norge	51%
Simula Metropolitan CDE AS	21.11.2017	Oslo	Norge	51%
Simula Consulting AS	07.11.2019	Fornebu	Norge	100%

	Result	Equity 31/12
Simula Innovation AS	31 565 724	54 880 907
Simula School of Research and Innovation AS	-602 317	14 045 990
Simula UIB AS	4 825 650	15 459 730
Simula Metropolitan Center for Digital Engineering AS	7 392 638	15 498 876

Non-consolidated subsidiaries:	Cost	Result	Equity 31/12
Simula Consulting AS, 100% owned by Simula Innovation AS	3 000 000	169	2 994 599
Simula Research Laboratory Inc. , 100 % owned by SRL	423 650	0	USD 50 000
Total investments non-consolidated subsidiaries	3 423 650	0	0

Note 11 Balances and transactions between group companies and associates

	2019	2018
Receivable from SI AS	201 630	1 990 409
Receivable from SSRI AS	1 177 688	764 008
Receivable from Simula UiB AS	0	31 250
Receivable from Simula Metropolitan	200 422	819 579
Payable to SI AS	5 361 000	164 140
Payable to SSRI AS	2 058 903	6 216 916
Payable to Simula UiB AS	12 330 000	3 921 333
Payable to Simula Metropolitan CDE AS	1 106 160	8 129 623
Salary costs refunded from SSRI AS	17 261 280	16 240 602
Sale of services, etc to SI AS	574 049	223 874
Sale of services, etc to SSRI AS	4 585 038	1 256 939
Sale of services, etc to Simula UiB AS	700 000	300 000
Sale of services, etc to Simula Metropolitan CDE AS	1 298 026	4 679 582
Purchases of services, etc from SI AS	2 559 310	2 385 935
Purchases of services, etc from SSRI AS	3 307 200	3 734 150
Purchases of services, etc from Simula UiB AS	0	1 000 000
Purchases of services, etc from Simula Metropolitan CDE AS	13 368 567	13 548 854

Note 12 Securities and shares in other enterprises, etc

Other share investments	Quantity	Face value per share	Shareholding	Cost price
ABCB AS	333	1	25.0 %	1 498 500
AlphaEntrance AS	13 400	1	6.9 %	999 975
Augere Medical AS	11 430	1	34.1 %	1 008 930
Blueware	334 319	USD 0.0001	1.8 %	7 000 000
Celerway Communications AS	22 500	1	49.3 %	3 017 745
Coupler AS	13 463	1	2.9 %	1 000 000
Edgefolio UK Limited	40 763	GBP 1.00	8.9 %	1 633 454
Entire Body AS	66 666	15	5.9 %	999 990
EYR Medical AS	20 839	0.3	6.5 %	2 033 314
Fabriscale Technologies AS	19 983	1	26.8 %	4 010 410
Facil AS	13 888	0.3	11.2 %	1 299 948
Forzasys AS	32 991	0.34	30.0 %	1 528 075
Imerso AS	591	10	10.7 %	1 615 925
Insilicomed Inc, USA	131 945	USD 1.8	-	1 220 755
Investory Onlineplattform GmbH	3 032	EUR 1	3.9 %	964 340
LeadX AS	5 666 667	0.001	14.2 %	1 500 000
MemoScale AS	7 812	1	5.2 %	1 249 920
N-Abel AS	3 750	1	10.0 %	500 000
Qbee AS	383	1	10.0 %	1 000 013
Quine AS	5 534	1	13.3 %	450 017
SmartBob AS	2 040	5.52	17.2 %	1 552 118
StalkIt AS	69	1000	3.3 %	1 001 209
Testify AS	44 433	1	30.0 %	1 427 117
Tipio AS	90 498	0.1	8.0 %	1 000 000
Truegroups AS	76 923	13	1.3 %	999 999
Unloc AS	2 505	1	4.8 %	1 499 754
Write-down of shares				8 712 820
Total investment in associates				33 298 688

Pre-seed investments on behalf of Innovasjon Norge AS

AlphaEntrance AS	9 999	1	5.2 %	1 500 000
AlphaEntrance AS	33 334	15	2.9 %	500 010
EYR Medical AS	6 521	0.3	2.0 %	1 499 830
Fabriscale Technologies AS	3 223	1	4.9 %	1 999 793
Facil AS	2 778	0.3	2.3 %	500 000
LeadX AS	1 333 333	0.001	3.3 %	500 000
Memoscale AS	3 125	1	2.1 %	500 000
StalkIt AS	69	1000	3.3 %	1 001 209
Truegroups AS	76 923	13	1.3 %	999 999
Unloc AS	630	1	1.2 %	499 760
Total pre-seed investments				9 500 601
Total investment in associates				42 799 289

Til generalforsamlingen i
SIMULA RESEARCH LABORATORY AS

UAVHENGIG REVISORS BERETNING

Uttalelse om revisjonen av årsregnskapet

Konklusjon

Vi har revidert SIMULA RESEARCH LABORATORY AS' årsregnskap som viser et overskudd for selskapsregnskapet på kr. 10.937.708,- og et overskudd for konsernregnskapet på kr. 36.300.283,-, og etter vår mening:

- er årsregnskapet avgitt i samsvar med lov og forskrifter
- gir selskapsregnskapet et rettviseende bilde av den finansielle stilling til SIMULA RESEARCH LABORATORY AS per 31. desember 2019 og av selskapets resultater og kontantstrømmer for regnskapsåret som ble avsluttet per denne datoen i samsvar med regnskapslovens regler og god regnskapsskikk i Norge.
- gir konsernregnskapet et rettviseende bilde av den finansielle stilling til konsernet SIMULA RESEARCH LABORATORY AS per 31. desember 2019 og av konsernets resultater og kontantstrømmer for det avsluttede regnskapsåret i samsvar med regnskapslovens regler og god regnskapsskikk i Norge.

Årsregnskapet består av:

- selskapsregnskapet, som består av balanse per 31. desember 2019, resultatregnskap og kontantstrømoppstilling for regnskapsåret avsluttet per denne datoen og noter, herunder et sammendrag av viktige regnskapsprinsipper, og
- konsernregnskapet som består av balanse per 31. desember 2019, resultatregnskap og kontantstrømoppstilling for regnskapsåret avsluttet per denne datoen og noter, herunder et sammendrag av viktige regnskapsprinsipper.

Grunnlag for konklusjonen

Vi har gjennomført revisjonen i samsvar med lov, forskrift og god revisjonsskikk i Norge, herunder de internasjonale revisjonsstandardene (ISA-ene). Våre oppgaver og plikter i henhold til disse standardene er beskrevet i Revisors oppgaver og plikter ved revisjon av årsregnskapet. Vi er uavhengige av selskapet slik det kreves i lov og forskrift, og har overholdt våre øvrige etiske forpliktelser i samsvar med disse kravene. Etter vår oppfatning er innhentet revisjonsbevis tilstrekkelig og hensiktsmessig som grunnlag for vår konklusjon.

Øvrig informasjon

Ledelsen er ansvarlig for øvrig informasjon. Øvrig informasjon består av årsberetningen, men inkluderer ikke årsregnskapet og revisjonsberetningen.

Vår uttalelse om revisjonen av årsregnskapet dekker ikke øvrig informasjon, og vi attesterer ikke den øvrige informasjonen.

I forbindelse med revisjonen av årsregnskapet er det vår oppgave å lese øvrig informasjon med det formål å vurdere hvorvidt det foreligger vesentlig inkonsistens mellom øvrig informasjon og årsregnskapet, kunnskap vi har opparbeidet oss under revisjonen, eller hvorvidt den tilsynelatende

inneholder vesentlig feilinformasjon. Dersom vi hadde konkludert med at den øvrige informasjonen inneholder vesentlig feilinformasjon er vi pålagt å rapportere det. Vi har ingenting å rapportere i så henseende.

Styrets og daglig leders ansvar for årsregnskapet

Styret og daglig leder er ansvarlig for å utarbeide årsregnskapet i samsvar med lov og forskrifter, herunder for at det gir et rettviseende bilde i samsvar med regnskapslovens regler og god regnskapsskikk i Norge. Ledelsen er også ansvarlig for slik intern kontroll som den finner nødvendig for å kunne utarbeide et årsregnskap som ikke inneholder vesentlig feilinformasjon, verken som følge av misligheter eller utilsiktede feil. Ved utarbeidelsen av årsregnskapet må ledelsen ta standpunkt til selskapets evne til fortsatt drift og opplyse om forhold av betydning for fortsatt drift. Forutsetningen om fortsatt drift skal legges til grunn for årsregnskapet så lenge det ikke er sannsynlig at virksomheten vil bli avvirket.

Revisors oppgaver og plikter ved revisjonen av årsregnskapet

Vårt mål er å oppnå betryggende sikkerhet for at årsregnskapet som helhet ikke inneholder vesentlig feilinformasjon, verken som følge av misligheter eller utilsiktede feil, og å avgi en revisjonsberetning som inneholder vår konklusjon. Betryggende sikkerhet er en høy grad av sikkerhet, men ingen garanti for at en revisjon utført i samsvar med lov, forskrift og god revisjonsskikk i Norge, herunder ISA-ene, alltid vil avdekke vesentlig feilinformasjon som eksisterer. Feilinformasjon kan oppstå som følge av misligheter eller utilsiktede feil. Feilinformasjon blir vurdert som vesentlig dersom den enkeltvis eller samlet med rimelighet kan forventes å påvirke økonomiske beslutninger som brukerne foretar basert på årsregnskapet.

For videre beskrivelse av revisors oppgaver og plikter vises det til

<https://revisorforeningen.no/revisjonsberetninger>

Uttalelse om øvrige lovmessige krav

Konklusjon om årsberetningen

Basert på vår revisjon av årsregnskapet som beskrevet ovenfor, mener vi at opplysningene i årsberetningen om årsregnskapet og forutsetningen om fortsatt drift er konsistente med årsregnskapet og i samsvar med lov og forskrifter.

Konklusjon om registrering og dokumentasjon

Basert på vår revisjon av årsregnskapet som beskrevet ovenfor, og kontrollhandlinger vi har funnet nødvendig i henhold til internasjonal standard for attestasjonsoppdrag (ISAE) 3000 «Attestasjonsoppdrag som ikke er revisjon eller forenklet revisorkontroll av historisk finansiell informasjon», mener vi at ledelsen har oppfylt sin plikt til å sørge for ordentlig og oversiktlig registrering og dokumentasjon av selskapets regnskapsopplysninger i samsvar med lov og god bokføringskikk i Norge.

Oslo, den 5. mars 2020



Erik A. Bell
Statsautorisert revisor

Simula Research Laboratory (Simula) is a non-profit enterprise owned by the Norwegian government for the benefit of the public. The company contributes to society by conducting fundamental and applied research within the scientific fields of communications systems, scientific computing, machine intelligence, software engineering and cyber security. Education and outreach are integral components of Simula's research remit, as are innovation and commercialisation activities that aim to bring theoretical results into society in concrete ways. Simula is committed to maintaining the highest ethical standards in achieving these goals, as well as ensuring optimum health and safety.

Social responsibility and workplace environment

Simula strives continuously to ensure good working conditions for all its personnel. The following summary highlights topics the Group is addressing in order to maintain and further develop its standards within ethics, gender balance and general working conditions.

Ethics

Maintaining high ethical standards is inherently valuable not only for Simula but for each individual employee. The Group's Code of Ethics has been developed to increase awareness of, and compliance with, the high ethical standards required of all employees. The code covers topics including research ethics; the working environment and inclusion; gifts, enticements and corruption; confidentiality; and conflicts of interest. Adhering to these standards creates a foundation of trustworthiness for collaborating with partners in research, as well as Norwegian society in general.

¹ Diversity includes gender, ethnicity, religion, life stance, disability, sexual orientation, gender identity, gender expression, age or combinations thereof. By ethnicity is meant, among other things, national origin, lineage, skin color and language. This is taken from the Equality and Anti-Discrimination Act: <https://lovdata.no/dokument/NLE/lov/2017-06-16-51>

Equality and Diversity¹

It is important for Simula to be a workplace where everyone has equal opportunities for professional and personal development, regardless of gender or ethnic background. Simula's diverse workforce represents 35 different nationalities, with half of the employees coming from outside of Norway. Measures are taken to ensure the transition to a Norwegian workplace is effective and positive, including administrative support and Norwegian language training.

Currently, 30% of Simula's employees are female (25% of scientific staff, see figure 2). Simula has the ambitious goal to increase the female proportion of the staff to 40% by 2028. Our continued focus on recruiting talented female candidates, and on developing and adapting working conditions for qualified women already employed in the Group, are important factors in achieving this goal.



Working Environment

Simula puts great emphasis on being an excellent place of work for all its employees. This is ensured through an internal inspection system that addresses health, safety and the working environment. Our Working Environment Committee endeavours to uphold and enhance the quality of the working environment, while also following up questions relating to the safety, health and welfare of employees.

Absence due to illness is generally low across the Group. The absence due to illness rate as of 31 December 2019 was 1,2% in Simula Research Laboratory, Simula School of Research and Innovation, Simula Innovation, SimulaMet and Simula UiB combined.

Simula has an agreement with NAV (the Norwegian Labour and Welfare Organisation) concerning "the inclusive workplace". Its purpose is to prevent and reduce absence related to illness, improve job attendance and the working environment, as well as avert exclusion and withdrawal from working life. An action plan that focuses on how Simula addresses these matters is discussed with NAV annually.

Competence Development and Recruitment

Simula depends on competent and motivated employees with specific expertise to reach its targets. We work continuously to attract, develop and retain talented employees with varied backgrounds. Simula facilitates professional and personal development to enhance expertise. In 2019, the Simula School of Research and Innovation organized a supervisor seminar for more than 30 employees, as well as a full-day PhD seminar for 34 PhD students.

Managers play a key role in achieving Simula's results. In 2019, several project leaders took part in leadership training programmes at

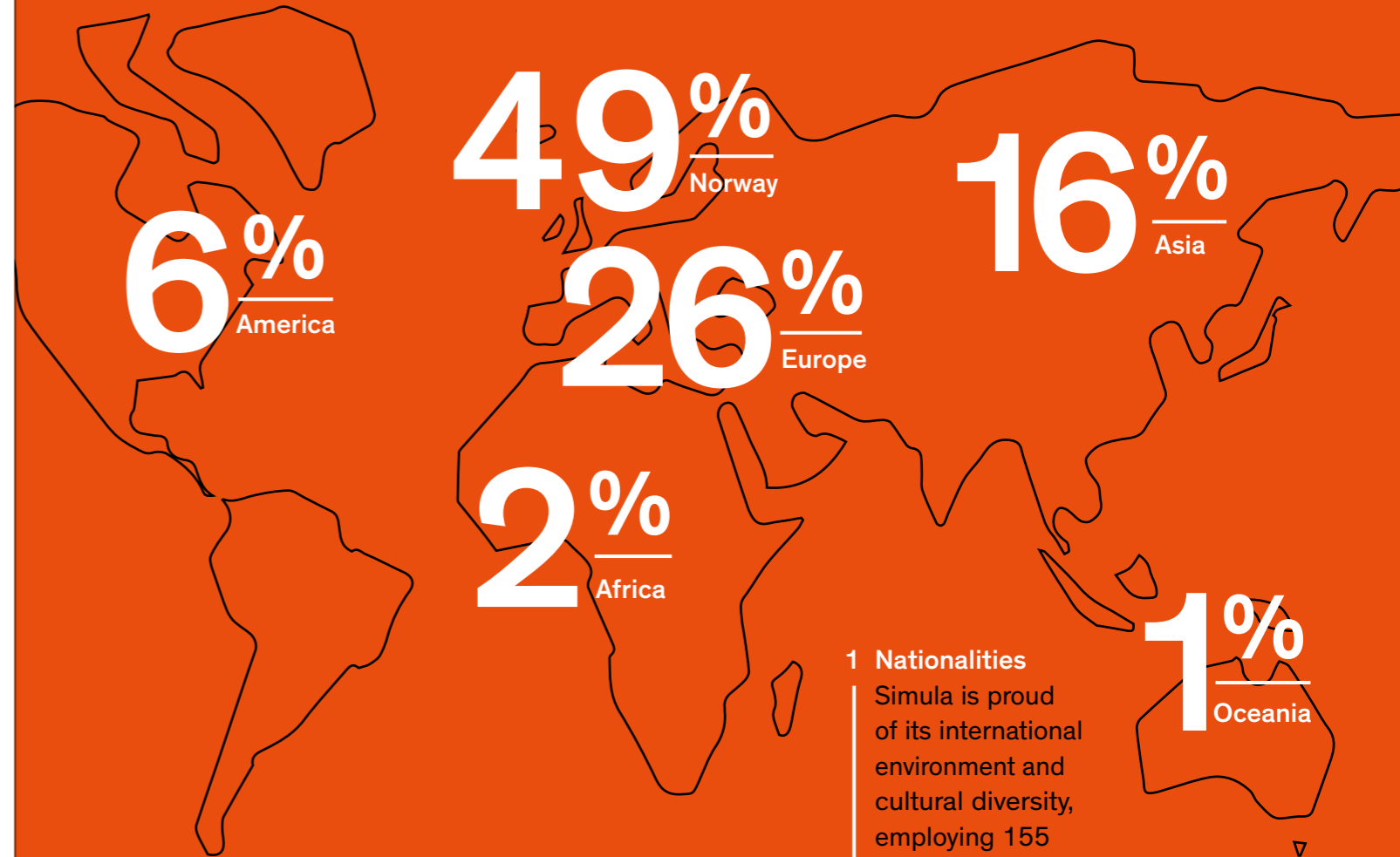
internationally renowned institutions including the Stanford University, USA, and the London Business School, UK. In addition, one employee is on leave in order to complete an MBA at SDA Bocconi School of Management in Milan, Italy.

Conflict Resolution and Notification of Censurable Conditions

Simula undertakes to ensure a safe and secure working environment in accordance with the Group's principles on workplace culture. Simula has developed guidelines for conflict resolution and notification that meet all the requirements of the Working Environment Act. The guidelines encourage employees to take an active role in creating an optimum working environment where conflict is handled in an open, honest and constructive way, and in efforts to prevent destructive forms of conflict from arising in the first place.

External Environment

Simula's activities do not pollute the external environment. We also encourage environmentally responsible behaviour through the way the company is run. To incentivise employees to commute to work using public transport rather than by car, Simula developed a programme to subsidise the cost of monthly public transport tickets; 57% of employees participated in this initiative in 2019. In addition, Simula continues to promote paper-free processes and has digitised administrative processes resulting in greatly reduced paper consumption and increased awareness among employees since the start of the campaign in 2010.

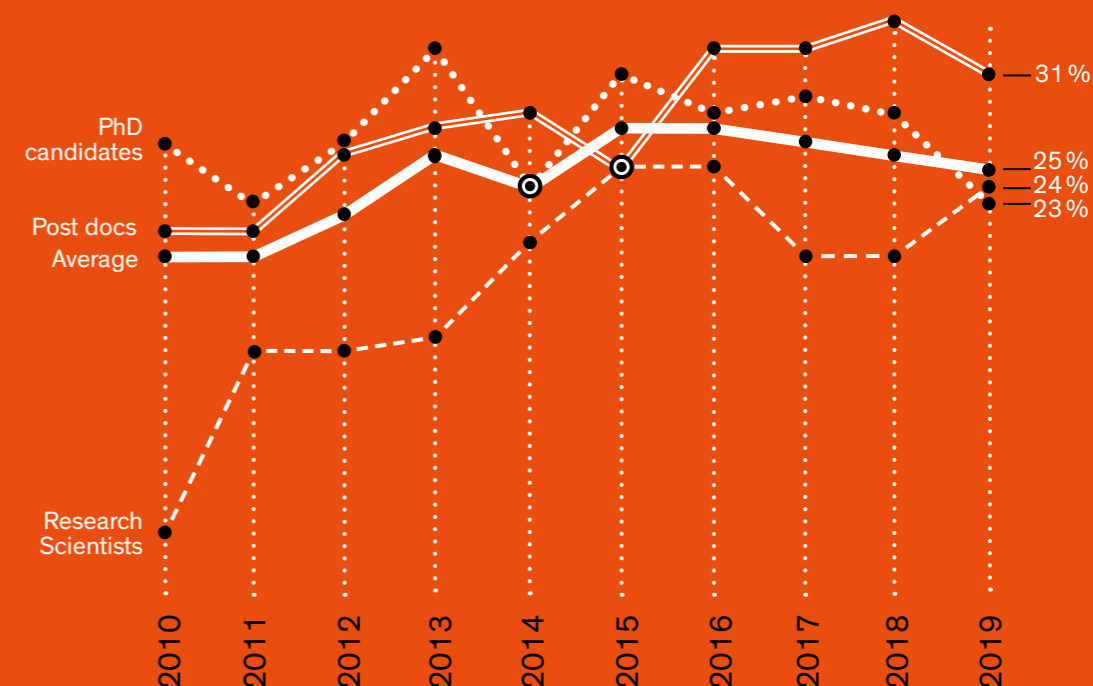


1 Nationalities

Simula is proud of its international environment and cultural diversity, employing 155 exceptional minds of 35 different nationalities.

2 Gender balance

The proportion of female researchers has increased from 2010-2019. Simula aims to increase the proportion of female staff to 40% within the next 8 years.





Education and Outreach Activities

Simula's educational and outreach activities are organised through the Simula School of Research and Innovation (SSRI).

Graduate students at both Masters and Doctoral level are supervised by Simula's researchers. Courses and seminars are also offered to students and researchers at Simula. Some of these courses are open to external students, such as the annual Summer School in Computational Physiology and the course on communicating scientific research.

SSRI's mission is to teach, inspire and educate young people in science and technology. In addition, our PhD students instruct teachers in programming.

Summer School in Computational Physiology

SSRI arranges this four-week intensive course for late Masters and early PhD students together with the University of California, San Diego (UCSD) and the University of Oslo.

It is divided into two segments; the first two weeks take place in Norway at Simula (Fornebu) and the second two weeks at UCSD in La Jolla, California. In 2019, 26 students completed the course.

Prepare

Under the Prepare project, Simula recruits high-school students as ambassadors who visit local schools to inspire other youngsters to increase their interest in technology and science. SSRI trains each ambassador to present scientifically complicated topics in an easy and appealingly way.

In 2019, Prepare fielded up to 16 ambassadors who together held 44 scientific lectures for approximately 800 students, including nine

classes at middle and secondary school level. Lecture subjects included the work of Simula, short courses and tasks in the text-programming language Python, as well as demonstrations of relevant research projects.

Kodeskolen ("Code school")

The Code School offers programming courses for teachers featuring an introduction to Python and how to facilitate learning in subjects such as mathematics and science. In 2019, Asker Municipality, Bærum Municipality and secondary schools in Akershus County sent a total of 72 teachers on 40-hour courses. In addition, 85 teachers and junior lecturers attended shorter courses. Courses have been held in Oslo, Lillesand, Bergen and Trondheim.

Summer Internships

Every year, SSRI hires students for summer internships, mainly at our Fornebu location. Interns are supervised by PhD candidates or researchers in postdoctoral positions. Between June and August 2019, 24 Norwegian and international students held summer jobs at SSRI.

26

students participated in the Summer School in Computational Physiology



SSRI in numbers 2019

72

teachers have completed the Code Schools 40-hours course

85

teachers has participated in the Code Schools crash course

9

students were supervised to the completion of their PhD

26

students were supervised to the completion of their Masters degree



24

Norwegian and foreign students held a summer job at Simula



simulamet

Simula Metropolitan Centre for Digital Engineering (SimulaMet) is a research institution established in 2018. In response to the needs of Norway, and more broadly of Europe, to strengthen research and education capacity in ICT and digitalisation, Simula Research Laboratory AS (Simula) and Oslo Metropolitan University (OsloMet) joined forces to found this new company. SimulaMet's mission is to conduct research in digital engineering at the highest international level, educate and supervise PhD and Masters students at OsloMet, and contribute to innovation in society through collaboration, startup-companies and licensing of research results.

Building the Organisation

SimulaMet started out with a small group of senior researchers in January 2018, with Professor Olav Lysne as director. The centre has grown tremendously since then. As of 1 January 2020, a group of around 60 people representing 20 different nationalities are formally affiliated with SimulaMet, both as employees and as collaborating guests. Of these, 19 are PhD students and seven are postdoctoral fellows.

Now, after two years of building the organisation, SimulaMet is well established within its three core research areas: Communication Systems, Information Technology Management, and Machine Learning. The current level of activity and resources reflects a status of full operation, as intended by the founders.

Strategic Partnership with OsloMet

One of SimulaMet's core objectives is to be OsloMet's strategic partner in research and PhD- and Masters education in digital engineering. Over two years in existence, this partnership has led to a range of positive

results. A new PhD programme in Engineering Science at OsloMet has been established, five researchers hold joint positions in the two organisations and several joint research proposals have been submitted resulting in new, externally funded projects that reinforce the collaboration. SimulaMet employs PhD students who are set for enrollment in OsloMet's PhD programme, and four courses at PhD and Masters level are taught by SimulaMet personnel. A new Masters programme opened at OsloMet in August 2019, with the first group of students finding their supervisors at SimulaMet. The partners have also jointly formed an Artificial Intelligence Lab whose activities involve students and researchers from both sides.

Activities and Research Results

In addition to the funding base from the owners, several research projects have been awarded funding from external sources. This enables expansion of activities and strengthens collaboration with partners and problem owners from industry, academia and public bodies. External funding sources

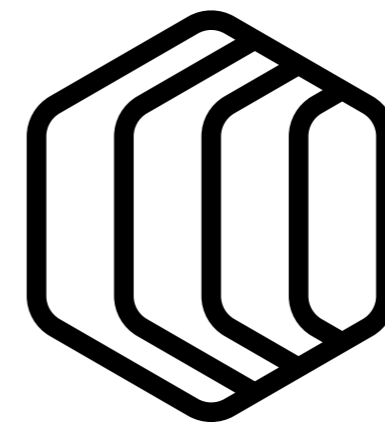


include the Norwegian Ministry of Local Government and Modernisation, the Research Council of Norway and the EU's Horizon 2020 platform.

SimulaMet's primary mission is to generate research results at the highest level. Over the two initial years, SimulaMet researchers have authored books, published journal and conference publications and supervised PhD and Masters candidates. In addition to teaching, the scientific staff organise workshops, conferences, industry seminars and summer schools, publish open data sets and source code, are advisors and members of governmental boards and academies, and have received best paper awards. SimulaMet is also proud that Chief Research Scientist Michael Riegler has been accepted into Norway's Academy of Young Scientists (Akademiet for Yngre Forskere). The academy selects talented young researchers from all disciplines through a scientific review process and interviews.

Simula UiB specialises in cyber security and conducts research and education in cryptography and information theory. The company is owned by Simula Research Laboratory AS (SRL) and the University of Bergen (UiB).

Through targeted work, Simula UiB has established sections in cryptology and information theory since its inception in 2016. By the end of 2019, both sections are fully engaged with research and education of Masters and PhD students. In total, the sections have supervised 19 Masters students and four PhD candidates to completed degrees. The cryptography section has also recruited PhDs who are eligible for security clearance.



Simula
UiB



Simula UiB has experienced strong growth over the past year. In 2019, the company employed two internationally recognized senior cryptologists, as well as two professors in 20% positions from Royal Holloway, University of London and Chalmers University of Technology in Gothenburg. We also added five new fellows and three new postdoctoral fellows, all of whom have already achieved publication at reputable conferences, including Asiacrypt. Researchers at Simula UiB also mentor fellows employed at the University of Bergen, as well as offering internships to students.

As a consequence of the increased number of employees in 2019, Simula UiB moved into new, modern premises at the start of 2020. When designing the premises, emphasis was placed on opportunities for project collaboration, varied workplaces and space for further growth. The office is located next door to UiB's Department of Informatics, which ensures proximity to the university environment.

External Cooperation

Simula UiB has assisted the Norwegian National Security Authority (NSM) in the

evaluation and analysis of the quality of its existing solution for hardware generation of cryptographic keys for use in military units and government. In collaboration with Widenorth, we have been awarded two projects by the European Space Agency (ESA). The first project, "Air Interface development for ultra-low powered Internet of Things for satellite applications", includes the development and analysis of error correction codes for a satellite communication system, and cryptographic mechanisms for confidentiality and authentication. The second project, "Wideband RF over IP demonstrator", includes development and analysis enabling remote processing of raw data from satellite communications. At the same time, researchers at Simula UiB have continued our collaboration with the Institute of Informatics at UiB by teaching three courses in cryptography and information theory.

Work Environment

Simula UiB enjoys a very good working environment. Our working environment survey conducted in 2019 confirmed that absence due to sickness is generally low throughout the group and that job satisfaction is high. As



of 31 December 2019, Simula UiB had a sick leave of 0.78, and throughout the year the company increased its focus on maintaining a good working environment. An HSE workshop was arranged to increase the involvement of employees. Positive and negative aspects of the working environment were discussed, as well as potential for improvement. One of the areas worked on afterwards has been mapping of employees' subject areas and interests in order to lower the threshold for collaboration.

New Laboratory

Simula UiB has commenced work on developing a laboratory in its new premises. The long-term goal of the lab is to educate graduates with combined hardware/software expertise for the Norwegian cryptography industry. We also want to develop presentations and prototypes that can effectively demonstrate secure technology for politicians, as well as industry and defence stakeholders. Another particular focus is to implement in real life the theoretical results generated by our researchers. At the beginning of 2020, the company is off to a good start with two pilot projects.

Doctorates and Master's Degrees 2019

This list presents PhD and MSc degrees awarded by degree awarding institutions in Norway and abroad in 2019. The degrees are obtained by candidates that are supervised throughout their projects by Simula researchers.

Doctorates

Student	Title of thesis	Supervisors	Co-supervisor(s)	Institution
Sigrid Møyner Hohle	Communicating the Future: Dynamic Implications of Probabilistic Climate Forecasts	Karl Halvor Teigen	Geir Kirkebøen	University of Oslo - Department of Psychology
Dipesh Pradhan	Evolutionary Computation Based Test Optimization of Large-Scale Systems	Tao Yue	Shuai Wang, Shaukat Ali	University of Oslo - Department of Informatics
Francisco Javier Velázquez-García	Middleware Mobility Services for Self-adaptive Multimedia Processing in Ubiquitous Computing Environments	Håkon Kvale Stensland	Pål Halvorsen, Frank Eliassen	University of Oslo - Department of Informatics
Endre Hegland Hjort Kure	Theoretical and Data-Driven Approaches for Energy-Efficient Networks	Yan Zhang	Sabita Maharjan, Stein Gjessing	University of Oslo - Department of Informatics
Viviane Timmermann	A Computational Study of Mechano-Electric Feedback Mechanisms	Samuel Wall, Andy Edwards	Joakim Sundnes, Andrew D. McCulloch, John Jeremy Rice	University of Oslo - Department of Informatics
Karoline Horgmo Jæger	Cell-Based Mathematical Models of Small Collections of Excitable Cells	Aslak Tveito	Mary Maleckar, Tuomo Mäki-Marttunen	University of Oslo - Department of Informatics
Vegard Vinje	Mathematical Modeling of Cerebro-spinal Fluid Pulsatility and Pathways	Marie Elisabeth Rognes	Kent-Andre Mardal, Yiannis Ventikos	University of Oslo - Department of Mathematics
Ioana Alexandrina Livadariu	Monitoring and Understanding Ipv6 Adoption	Ahmed Elmokashfi	Olav Lysne	University of Oslo - Department of Informatics
Konstantin Vladimirovich Pogorelov	DeepEIR: A Holistic Medical Multimedia System for Gastrointestinal Tract Disease Detection and Localization	Pål Halvorsen	Carsten Griwodz, Michael Riegler	University of Oslo - Department of Informatics

Master's Degrees

Student	Title of thesis	Supervisors	Co-supervisor(s)	Institution
Henry Ckukwuemeke Afambu	Computational Modeling of perfusion to the heart	Alexandra Diem	Klas Pettersson	University of Tromsø
Patryk Kucmann	Selection of Software Tests and Mutants with Contextual Bandits	Arnaud Gotlieb	Dag Langmyhr, Helge Spieker	University of Oslo - Department of Informatics
Asad Sajjad Ahmed	Extending TCP for Low Round Trip Delay	Bob Briscoe	Andreas Petlund	University of Oslo - Department of Informatics
Magnus Vevik Austrheim	Implementing Immediate Forwarding for 4G in a network simulator	Bob Briscoe	Andreas Petlund	University of Oslo - Department of Informatics
Oscar Ofordile Odeigah	Optimized cardiac simulation as a tool to understand patient specific mechanical function	Joakim Sundnes	Samuel Wall	University of Tromsø
Mathias Kirkerød	Unsupervised Preprocessing of Medical Imaging Data with Generative Adversarial Networks	Michael Riegler	Pål Halvorsen	University of Oslo - Department of Informatics
Sharanan Kulam	Time-Series Classification with Uni-Dimensional Convolutional Neural Networks - An Experimental Comparison with Long Short-Term Memory Networks	Michael Riegler	Pål Halvorsen, Lars Holmeffjord, Konstantin Pogorelov	University of Oslo - Department of Informatics

Master's Degrees

Student	Title of thesis	Supervisors	Co-supervisor(s)	Institution
Marius Alexander Skjolden	Performance and resource usage of multi-link HTTP in modern smartphones	Pål Halvorsen	Audun Fosselie Hansen	University of Oslo - Department of Informatics
Joakim Ihle Frogner	One-Dimensional Convolutional Neural Networks on Motor Activity Measurements in Detection of Depression	Pål Halvorsen	Michael Riegler	University of Oslo - Department of Informatics
Son Thanh Vo	Cosinus: Monitoring Electric Vehicles	Pål Halvorsen	Michael Riegler	University of Oslo - Department of Informatics
Aanund Nordskog	No Silver Bullet	Pål Halvorsen	Michael Riegler	University of Oslo - Department of Informatics
Abdinassir Ali Abdikarim	Investigating correlations between tire-road friction, vehicle velocity and vehicle sideslip for enhancing vehicle safety towards autonomous driving	Sabita Maharjan	Per Andreas Langeland	Kingston University, London, England
Vlorjan Badallaj	How many charging stations for E-cars are needed in Oslo by 2020?	Sabita Maharjan	Stein Gjessing, Yan Zhang	University of Oslo - Department of Informatics
Hamzeh Mohammadnia	IoT-NETZ: Spoofing Attack Mitigation in IoT Network	Sabita Maharjan	Yan Zhang	KTH Royal Institute of Technology, Sweden
Andreas Oslandsbotn	Shape Optimisation with the Multimesh Formulation of the Stokes Equations	Simon Funke	Jørgen Dokken; Jon Andreas Støvneng	Norwegian University of Science and Technology
Edvarda Regine Winlund Eriksen	A Machine Learning Approach To Improve Consistency In User-Driven Medical Image Analysis	Valentina Carapella	Stein Gjessing; Michael Riegler, Pål Halvorsen	University of Oslo - Department of Informatics
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- 03 **A mixed finite element method for nearly incompressible multiple-network poroelasticity**
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- 05 **Agile Uncertainty Assessment for Benefit Points and Story Points**
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24 **Cisco and Certus after 8 years: Current projects and reflections on what has been learned**

Carl Martin Rosenberg, Marius Liaaen, The 14th Certus User Partner Workshop

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Alexandre Graell i. Amat, Eirik Rosnes, Albin Severinson, Waikoloa, HI, USA

26 **Compiling finite element variational forms for GPU-based assembly**

James D. Trotter, Xing Cai, Simon W. Funke, Johannes Langguth, FEniCS'19, Washington DC, USA

27 **Conducting realistic, controlled experiments in software engineering**

Magne Jørgensen, Seminar for PhD-students at University of Manaus, Brazil

28 **Covariance and precision matrix estimation, and dimension reduction in regression problems**

Zeljko Kereta, Timo Klock, Valeriya Naumova, Oslo, Norway

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Leon Moonen, The 14th Certus User Partner Workshop, Larvik, Norway

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Arnaud Gotlieb, AI4EU Event AI Ecosystem Development Forum, Athens, Greece

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Olav Lysne, Eierskapsavdelingen, Ministry of Trade and Fisheries, Norway

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Olav Lysne, Ministry of Local Government and Modernisation, Norefjell, Norway

33 **Data-Intensive Computing on Cross-Clouds**

Feroz Zahid, Geir Horn, Gjøvik, Norway

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Helge Spieker, 14th Certus User Partner Workshop (UPW), Larvik, Norway
- 35 **Digitale Verdikjeder – et rammeverk**
Olav Lysne, Forum for nasjonal IKT–sikkerhet, Ministry of Justice and Public Security, Norway
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Olav Lysne, Forsvarets Etterretningshøgskole, Norway
- 37 **Digitalt grenseforsvar – sikkerhetsutfordringer og personvern**
Olav Lysne, Forsvarets Høgskole, Informasjonskurs, Hadeland, Norway
- 38 **Digitalt grenseforsvar og ny etterretningslov**
Olav Lysne, Forsvarets Høgskole, Akershus Festning, Norway
- 39 **Digitalt grenseforsvar og ny etterretningslov**
Olav Lysne, Forsvarets Høgskole, Norway
- 40 **Don't Trust Your Eyes: Manipulation of Visual Media in the Age of Deepfakes**
Johannes Langguth, Petra Filkukova, 4th International Conference on Communication & Media Studies, Bonn, Germany
- 41 **Dønski videregående skole: How do we breathe?**
Sagar Sen, Fornebu, Norway
- 42 **Dynamic Sharing of GPUs and IO in a PCIe Network**
Håkon Kvale Stensland, GPU Technology Conference, San Jose, CA, USA
- 43 **Enabling automated requirements reuse and configuration**
Yan Li, Tao Yue, Shaukat Ali, Li Zhang, 23rd International Systems and Software Product Line Conference, Paris, France
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Sabita Maharjan, Department of Informatics, University of Oslo, Oslo, Norway
- 45 **Energy Intelligence: Vehicle-to-Grid Systems**
Sabita Maharjan, Technical University of Berlin, Germany
- 46 **Estimering av IT–utvikling**
Magne Jørgensen, Seminar, Knowit, Norway
- 47 **Et rammeverk for digitale verdikjeder**
Olav Lysne, ISF–Sikkerhetsfestivalen, Lillehammer, Norway
- 48 **Et rammeverk for risikostyring i digitale verdikjeder**
Olav Lysne, Sentralt Totalforsvarsforum, Nasjonal Sikkerhetsmyndighet, Oslo, Norway
- 49 **Finite element modeling of cardiac tissue in heart-on-a-chip systems**
Åshild Telle, Bérénice Charrez, Kevin E. Healy, Aslak Tveito, Samuel Wall, Washington DC, USA
- 50 **Free-radical Research in State-governed Data-intensive Systems**
Sagar Sen, Geilo, Norway
- 51 **Fremtidens mobilnett: mange egg i samme kurv**
Olav Lysne, Frokostmøtet om fremtidens Nødnett, Litteraturhuset, Oslo, Norway
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Magne Jørgensen, Seminar on effective software development, Kathmandu, Nepal
- 53 **Heterogeneous computing for cardiac electrophysiology**
Xing Cai, PREAPP workshop on Efficient Frameworks for Compute- and Data-intensive Computing (EFFECT), University of Tromsø, Norway
- 54 **How ABB and Certus work together to build better continuous integration testing of cyber-physical systems**
Helge Spieker, 14th Certus User Partner Workshop (UPW), Larvik, Norway
- 55 **Huawei and 5G Networks**
Olav Lysne, ERVE Forum, Helsinki, Finland
- 56 **Huawei og Overvåkning**
Olav Lysne, DNB Markets, Hotel Continental, Norway
- 57 **Hva kjennetegner IT-utvikling som lykkes?**
Magne Jørgensen, Seminar for Helsedirektoratet, Hønefoss, Norway
- 58 **Hva kjennetegner IT-utvikling som lykkes?**
Magne Jørgensen, Presentasjon for Skatteetaten (intern workshop), Norway
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Arnaud Gotlieb, 31st IFIP WG6.1 International Conference, ICTSS 2019, Paris, France
- 60 **Intracranial pressure elevation alters CSF clearance pathways**
Vegard Vinje, Karen-Helene Støverud, Marie E. Rognes, Kent-Andre Mardal, Anders Eklund, The 2019 CSF Symposium, Oslo, Norway
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Kent-Andre Mardal, IMG 2019, Kunming, China
- 62 **Mathematical modeling of the glymphatic system**
Kent-Andre Mardal, ICIAM, Valencia, Spain
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Viviane Timmermann, Alexander T. Quinn, Andrew D. McCulloch, Cardiac Physiome, Maastricht, Netherlands
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Thomas Dreibholz, Hainan University, Haikou, Hainan/People's Republic of China
- 65 **MELODIC at Hainan University: Combining NorNet Core with MELODIC**
Thomas Dreibholz, Haikou, Hainan, People's Republic of China
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Cécile Daversin-Catty, Marie E. Rognes, FEniCS'19, Washington DC, USA
- 67 **Mixed-dimensional coupled finite elements in FEniCS**
Cécile Daversin-Catty, Marie E. Rognes, ENUMATH 2019, Egmond aan Zee, The Netherlands
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Sabita Maharjan, COSAFE Annual Workshop on Cooperative, Connected and Intelligent Vehicles, Aston University, Birmingham, UK
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Kristian Valen–Sendstad, American Physical Society, Seattle, WA, USA
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Miroslav Kuchta, Enumath 2019, the Netherlands
- 71 **Nearly incompressible generalized poroelasticity – discretization and preconditioning**
Marie E. Rognes, International workshop in connection with Ragnar Winther's 70th birthday, Oslo, Norway
- 72 **NorNet at Hainan University: From Simulations to Real-World Internet Measurements for Multi-Path Transport Research**
Thomas Dreibholz, Hainan University, Haikou, Hainan/People's Republic of China
- 73 **NorNet at Hainan University: Getting Started with NorNet Core**
Thomas Dreibholz, Haikou, Hainan, People's Republic of China
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Olav Lysne, Sårbarhetskonferansen, Norway
- 75 **Parameter Identification of Brain Cleaning**
Kent-Andre Mardal, ICIAM, Valencia, Spain
- 76 **PGAS for graph analytics: can one sided communications break the scalability barrier?**
Johannes Langguth, EFFECT workshop, Tromsø, Norway
- 77 **PGAS for graph analytics: can one sided communications break the scalability barrier ?**
Johannes Langguth, Computing Frontiers, Alghero, Italy
- 78 **Practical Cyber-Physical Systems Testing with Artificial Intelligence Techniques**
Shaukat Ali, Artificial Intelligence Lab, Oslo Metropolitan University, Norway
- 79 **Preconditioning of multi-physics problems with applications to the biomechanics of the brain**
Kent-Andre Mardal, MOX, Milan, Italy
- 80 **Preconditioning with some application to brain modeling**
Kent-Andre Mardal, Symposium on the occasion of Ragnar Winther's 70th birthday, Oslo, Norway
- 81 **Recent developments in dolphin-adjoint**
Sebastian Mitusch, Simon W. Funke, Jørgen Schartum Dokken, Simon W. Funke, Jørgen Schartum Dokken
- 82 **Robtest : A Constraint Programming Approach to Generate Optimal Test Trajectories for Industrial Robots**
Mathieu Collet, 14th Certus User Partner Workshop, Larvik, Norway
- 83 **Robust preconditioners for multi-physics problems involving porous flow in physiology modeling**
Miroslav Kuchta, Kent-Andre Mardal, ICIAM 2019, Valencia, Spain
- 84 **Robust Preconditioners for Multiscale Systems in Biomechanics**
Miroslav Kuchta, Kent-Andre Mardal, 12th International Conference on Large-Scale Scientific Computations, Sozopol, Bulgaria
- 85 **Search-based test case implantation for testing untested configurations**
Dipesh Pradhan, Shuai Wang, Tao Yue, Shaukat Ali, Marius Liaaen, 34th IEEE/ACM International Conference on Automated Software Engineering (ASE 2019), San Diego (CA), USA
- 86 **Should artificial intelligence be part of your strategy?**
Sagar Sen, Klosser Innovation, Hamar, Norway
- 87 **Simula Research Laboratory: Constraint Programming for Software Engineering**
Arnaud Gotlieb, NordConsNet Workshop 2019 – The 18th workshop of NordConsNet, the Nordic Network for researchers and practitioners of Constraint Programming, Norway
- 88 **Smart cities for a Sustainable Energy Future– From design to practice**
Sabita Maharjan, Technical University of Berlin, Germany
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Mathieu Collet, NordCons 19, Oslo, Norway
- 90 **Supporting Continuous Engineering with Automated Log Clustering and Diagnosis**
Leon Moonen, KTH Royal Institute of Technology, Stockholm, Sweden
- 91 **Teknologiutvikling og samfunnsikkerhet**
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- 92 **Teknologiutvikling og Totalforsvaret**
Olav Lysne, Nasjonal Beredskapskonferanse, Norway
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Arnaud Gotlieb, RoboSoft: Software Engineering for Robotics – Royal Academy of Engineering, London, UK
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Vegard Vinje, Bio-Mechanics workshop on cell membrane dynamics, active matter and plasticity in tissue, Tøyen Hovedgård, Oslo, Norway
- 95 **The Huawei and Snowden Questions**
Olav Lysne, Forsvarets Etterretningshøgskole, Norway
- 96 **The Huawei and Snowden Questions**
Olav Lysne, Paranoia Conference, Norway
- 97 **The Huawei and Snowden Questions**
Olav Lysne, Lab41, In-Q-Tel, Washington DC, USA
- 98 **The Huawei and Snowden Questions**
Olav Lysne, Cyber Security in the Energy Sector, NVE, Oslo, Norway
- 99 **The Norwegian model: the need for a Digital Border Defence**
Olav Lysne, Oslo militære samfund, Cyber Security Seminar, Oslo, Norway
- 100 **The TSAR Project**
Arnaud Gotlieb, Dusica Marijan, 14th Certus User Partner Workshop, Sep. 2019, Larvik, Norway
- 101 **Tilrettelagt innhenting av grensekryssende datatrafikk**
Olav Lysne, EOS–utvalget, Norway
- 102 **Tilrettelagt innhenting og kontrollmekanismer**
Olav Lysne, Nordisk møte for kontrollorganer for etterretnings- og sikkerhetstenester
- 103 **Time–aware Test Execution Scheduling for Cyber–Physical Systems**
Morten Mossige, Arnaud Gotlieb, Helge Spieker, Hein Meling, Mats Carlsson, Gesellschaft für Informatik Software Engineering Conference 2019 (SE19), Germany
- 104 **Towards a virtual institute of independent science in Norway**
Sagar Sen, OsloMet, Oslo, Norway
- 105 **Towards nonlinear sufficient dimension reduction**
Zeljko Kereta, Timo Klock, Valeriya Naumova, AIP conference, Grenoble, France
- 106 **Towards real time simulations for in silico arrhythmia risk prediction**
Johannes Langguth, Annual Meeting of the Scandinavian Physiological Society, Cardiac Physiology Special Interest Group pre-meeting, Reykjavik, Iceland
- 107 **Training of Deep Learning Models with Reduced Training Dataset using Regression Testing**
Mohit Kumar Ahuja, 14th Certus User Partner Workshop (UPW), Larvik, Norway

- 108 Truth is in the eye of the beholder: Factors impacting fake news recognition**
Petra Filkukova, Steven Sloman, Peter Ayton, 27th biennial conference on Subjective Probability, Utility, and Decision Making, Amsterdam, The Netherlands
- 109 Uncertainty in Requirements**
Shaukat Ali, Nanjing University of Aeronautics and Astronautics, Nanjing, China
- 110 Uncertainty quantification of parenchymal tracer distribution using random diffusion and convective velocity fields**
Vegard Vinje, Matteo Croci, Marie E. Rognes, International congress on industrial and applied mathematics, Valencia, Spain
- 111 Uncertainty-wise Test Case Generation and Minimization for Cyber-Physical Systems**
Man Zhang, Shaukat Ali, Tao Yue, 34th IEEE/ACM International Conference on Automated Software Engineering (ASE 2019), San Diego (CA), USA
- 112 Unraveling Biomarkers through Multi-Modal Data Fusion**
Evrin Acar Ataman, IEEE ISMICT (International Symposium on Medical Information and Communication Technology), Oslo, Norway
- 113 Unraveling Interpretable Patterns through Data Fusion based on Coupled Matrix and Tensor Factorizations**
Evrin Acar Ataman, KDD Workshop on Tensor Methods for Emerging Data Science Challenges, Anchorage, Alaska, USA
- 114 Unraveling Interpretable Patterns through Data Fusion based on Coupled Matrix and Tensor Factorizations**
Evrin Acar Ataman, AI and Tensor Factorizations for Physical, Chemical, and Biological Systems, Santa Fe, NM, USA
- 115 Unstructured computational meshes and data locality**
Xing Cai, Fifth Workshop on Programming Abstractions for Data Locality (PADAL'19), Inria Bordeaux, France
- 116 UQ of parenchymal tracer distribution using random diffusion and convective velocity fields**
Marie E. Rognes, 5th biennial CSF Dynamics Symposium, Oslo, Norway

- 117 What can – and should – software engineering learn from psychology? (with a focus on research method)**
Magne Jørgensen, ICSIE, Cairo, Egypt
- 118 What makes software development projects successful, and what makes them fail? (and how to find out)**
Magne Jørgensen, Presentation at Simula Summer School, Berlin, Germany
- 119 When sharing is not caring: Individual differences in the evaluation of news quality**
Petra Filkukova, Peter Ayton, Steven Sloman, Johannes Langguth, 4th International Conference on Communication & Media Studies, Bonn, Germany

Posters

- 01 A numerical model of mechanical properties of cardiac tissue in heart-on-a-chip devices**
Åshild Telle, Bérénice Charrez, Kevin E. Healy, Aslak Tveito, Samuel Wall, Norwegian meeting on PDEs, Trondheim, Norway
- 02 Algorithmic differentiation for coupled FEniCS and PyTorch models**
Sebastian Mitusch, Simon W. Funke, ICCOPT, Berlin, Germany
- 03 Can turbulent-like flow cause high frequency vibrations of intracranial aneurysm walls?**
Alban Souche, Kristian Valen-Sendstad, Biomechanics in Vascular Biology and Cardiovascular Disease (14th international symposium), London, United Kingdom
- 04 Efficient Processing of Medical Videos in a Multi-auditory Environment Using Gpu Lending**
Rune Borgli, Hanna Borgli, Konstantin Pogorelov, Michael Riegler, Jonas Markussen, Håkon Kvale Stensland, Pål Halvorsen, Carsten Griwodz, Sigrun Losadal Eskeland, Thomas de Lange, NVIDIA's GPU Technology Conference (GTC)
- 05 Identifying weights of overcomplete shallow – and two layer neural networks using few network evaluations**
Massimo Fornasier, Timo Klock, Michael Rauchensteiner, Deepmath

- Conference, New York, USA
- 06 Linear convergence and support recovery for non-convex multi-penalty regularization**
Zeljko Kereta, Valeriya Naumova, Johannes Maly, SPARS 2019, Toulouse, France
- 07 Porous modelling of cardiac perfusion to optimise targeted drug delivery**
Alexandra K. Diem, Kristian Valen-Sendstad, Computing in Cardiology, Singapore
- 08 QoE-Based Analysis of Real-Time Adaptive 360-Degree Video Streaming**
Cise Midoglu, Magnus Klausen, Özgü Alay, Anis Yazidi, Harek Haugerud, Carsten Griwodz, Proceedings of the 2019 on Wireless of the Students, by the Students, and for the Students Workshop, New York, USA
- 09 Towards Detailed Real-Time Simulations of Cardiac Arrhythmia**
Johannes Langguth, Hermenegild Arevalo, Kristian Gregorius Hustad, Xing Cai, International Conference in Computing in Cardiology, Singapore
- 10 Towards Sequence-to-Sequence Reinforcement Learning for Constraint Solving with Constraint-Based Local Search**
Helge Spieker, Conference on Artificial Intelligence (AAAI-19), Hawaii, USA
- 11 Unsupervised Parameter Selection in Variational Regularization**
Ernesto De Vito, Zeljko Kereta, Valeriya Naumova, SPARS 2019, Toulouse, France

Public outreach

- 01 5G and Digital Security**
Olav Lysne, Body of European Regulators of Electronic Communications
- 02 5G and Huawei**
Olav Lysne, NRK TV
- 03 5G and Huawei**
Olav Lysne, podcast Forklart, Aftenposten
- 04 An interview with Géraldine Morin**
Géraldine Morin, Michael Riegler, vol. 10, p. 4, ACM SIGMultimedia Records

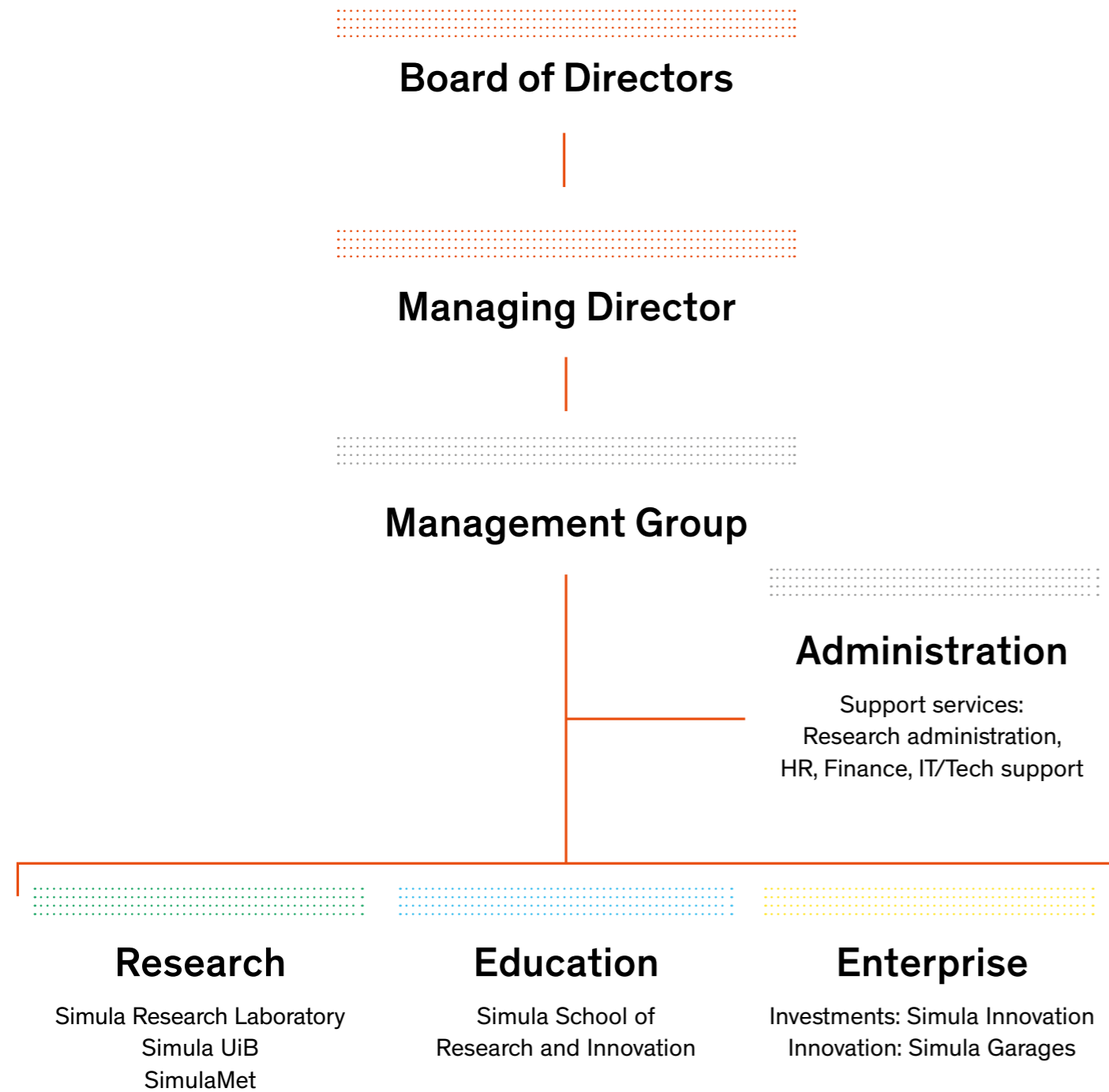
- 05 Andadrátturinn kann fyrirbyrgja heilasjúkum**
Vegard Vinje, Faroe Islands, KVF
- 06 Breathing right while rowing**
Sagar Sen
- 07 Debate on 5G and Huawei**
Olav Lysne, Debatten, NRK TV
- 08 Force curves that can help you row faster on water**
Sagar Sen
- 09 Forstyrrelser, avbrudd og produktivitet**
Magne Jørgensen, Computerworld Norway
- 10 Huawei and 5G**
Olav Lysne, Teknisk Ukeblad
- 11 Huawei: En risiko eller ikke?**
Olav Lysne, NUPI
- 12 I praksis riktig, men i teorien feil: Kostnadsbesparelser i team**
Magne Jørgensen, Computerworld Norway
- 13 Interpersonal Synchronization of Breathing while Singing**
Sagar Sen
- 14 Mathematical modelling of glials – the forgotten brain cell**
Ada Johanne Ellingsrud, The Ada Lovlace day arranged by EL & IT (Oslo, Norway)
- 15 Measurement of Breathing in Opera Singing at the Voex Festival, Den Norsk Opera**
Sagar Sen, Den Norsk Opera
- 16 Norgesglasset: Pusten kan påvirke rensing av hjernen**
Vegard Vinje, Nrk Norgesglasset, NRK
- 17 Norsk studie: Pusterytmen din kan ha en relevans til Alzheimer**
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- 18 Ny etterretningslov, Paneldebatt**
Olav Lysne, Nobels Fredssenter, Den Norske Atlanterhavskomiteé
- 19 Panel debate on 5G and the relation between Supplier and Security**
Olav Lysne, Stockholm, BB4ALL
- 20 Paneldebatt om ny etterretningslov**
Olav Lysne, Arendal, Norway, Norsk Senter for Menneskerettigheter
- 21 Pusten kan påvirke rensing av hjernen**
Vegard Vinje, Forskning.no
- 22 Report from the SIGMM Emerging Leaders Symposium 2018**
Alan Smeaton, Hanwang Zhang, Michael Riegler, Jia Jia, Liqiang Nie, vol. 2, p. 2, ACM SIGMultimedia Records
- 23 Sannsynlighetsvurderinger av kostnader**
Magne Jørgensen, Computerworld Norway

- 24 Smidig og stor – en selvmotsigelse innen IT-utvikling?**
Magne Jørgensen, Computerworld Norway
- 25 Usannsynlige sannsynligheter**
Magne Jørgensen, Computerworld Norway
- 26 Útvarpstíðindi 12:20**
Vegard Vinje, KVF

Miscellaneous

- 01 Kunstig intelligens for endoskopi – Automatisk deteksjon av lesjoner i sanntid**
Pia H. Smedsrud, Michael Riegler, Thomas de Lange, Andreas Petlund, Sigrun Losada Eskeland, Pål Halvorsen, NGF Nytt, Vol. 26, No 1, March 2019, p. 34, Norsk Gastroenterologisk Forening
- 02 Method of computing balanced routing paths in fat-trees**
Jesus Camacho, Tor Skeie, Sven-Arne Reinemo, no. 15/679, 974
- 03 NorNet at the University of Sydney: From Simulations to Real-World Internet Measurements for Multi-Path Transport Research**
Thomas Dreibholz, Sydney, New South Wales/Australia, University of Sydney
- 04 Tutorial: Good Bye Vendor Lock-in: Getting your Cloud Applications Multi-Cloud Ready!**
Feroz Zahid, Geir Horn, Kyriakos Kritikos, Marta Rózańska, The 19th IEEE/ACM International Symposium in Cluster, Cloud, and Grid Computing (CCGrid), ACM IEEE

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