2021

simula

Annual Report

Contents

Farewell Fornebu

Managing Director's report

On Friday, 10th of September 2021, I had my last working day in the old terminal building at Fornebu. Simula first moved to Fornebu in December 2001, as a project under the University of Oslo. On the 1st of May 2002, I took over as managing director of Simula and on the 11th of June, Simula Research Laboratory AS was established.

From the financial statement in 2001, I see that the payroll costs were approximately 8.5 million NOK[1], while the corresponding expenses for 2021 were 178 million NOK. Our entire time at Fornebu has been characterised by growth, but not only in Bærum. We eventually established a subsidiary in Bergen together with the University of Bergen, and another subsidiary at Bislett together with Oslo Metropolitan University. The growth has come in the form of research projects from the Research Council of Norway and the European Union, as well as grants from several Norwegian ministries: the Ministry of Education and Research, the Ministry of Transport, the Ministry of Trade and Industry, the Ministry of Local Government and Regional Development, and the Ministry of Justice and Public Security. In addition, we have received 1 million NOK per year in support from Bærum Municipality for a long time. We are very grateful for that - municipalities do not usually distribute funds for basic research.

The years at Fornebu have given Simula a great opportunity to develop its own profile and culture. We have tried to combine basic research with great emphasis on the supervision of young researchers and on the commercialization of research. From the last evaluation of Simula, all our research areas received the score "excellent"[2]. Furthermore, we have thus far supervised 509 Master's students and 156 PhD students to degree completion, and we are currently co-owners in 35 start-up companies with a total of 410 employees. We have also been named as one of the research institutions that have obtained the most EU funding through the Horizon 2020 program. Looking at the numbers per employee, Simula lands high up the list - only beaten by SINTEF.

The years at Fornebu have been good. Visitors have admired the surroundings, the closeness to the sea and the spacious premises. Still, we moved. There is little doubt that Fornebu never became what the enthusiasts had outlined. IT-Fornebu was never particularly concerned with technology development. It was a real estate company that profited well from developing a fantastic area when Norway's main airport was moved from Fornebu to Gardermoen. Fornebu is developing nicely, both for business and for residents, but it never became a centre for research and higher education, and it quickly became clear that there was neither commercial nor political will to develop it. Simula was left alone and we did well - but one swallow does not make a summer. We have moved to downtown Oslo (Kristian Augusts gate 23) and have already noticed the benefits of our proximity to both UiO and OsloMet.

Will the development of Simula over the next 20 years be as good as it was in the previous 20? That is of course difficult to answer, but some factors give cause for optimism. We receive far better applicants for all our positions than we did 20 years ago, and we have a completely different visibility internationally and are now an attractive partner both nationally and internationally. We must maintain our concentration on a few strong subject areas. We must insist on research quality, we must insist on good dissertations, and we must continue to invest in very promising, technology-based, start-up companies. And we must continue to develop strong collaborative relationships both in Norway and internationally.

Professor Aslak Tveito

CEO
Simula Research Laboratory

[1] https://www.simula.no/sites/default/files/simula_annual2001.pdf

[2] The term "excellent" refers to the specific scientific quality assessment described by the Research Council of Norway as: "Internationally front position, undertaking original research, publishing in the best international journals, and presenting research at recognized international conferences with peer review. High productivity. Very positive overall impression of the research group."

Report of the Board of Directors 2021

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

In 2021, its 20th year of operations, Simula Research Laboratory AS (SRL) and the Simula Group achieved a turnover of NOK 153 million and NOK 267 million, respectively, and a net result of NOK 10.7 million and NOK 17.4 million.

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 by SRL and manages SRL's investment portfolio. Simula Learning AS (previously SSRI) is owned jointly by SRL (72%), Equinor (14%), the Municipality of Bærum (9%), and Telenor (5%). Simula UiB AS is owned by SRL (51%) and the University of Bergen (49%). Simula Metropolitan Center for Digital Engineering AS (SimulaMet) is owned by SRL (51%) and Oslo Metropolitan University (49%). Simula Consulting AS, established on January 1st 2020, is owned by Simula Innovation (100%). In 2021, it was decided that the ownership of Simula Consulting would be transferred to SRL in 2022.

The parent company and its subsidiaries co-operate closely. In September 2021, Simula's headquarters moved from Fornebu in Bærum to downtown Oslo, Tullinløkka. The majority of the companies are based in downtown Oslo (Tullinløkka and Bislett), except for Simula UiB, which is located in Bergen.

Activities

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

In November, Simula@BI officially opened. Simula@BI is a collaboration between Simula and BI Norwegian Business School and will focus on basic and applied research at the intersection of data science, machine learning, economics, and finance. BI owns the centre, while Simula is a partner through a collaboration agreement.

The activities in 2021 were again affected by the Covid-19 pandemic. At the beginning of the pandemic in 2020, Simula was affected through the reduction or suspension of important parts of international research collaboration, which has partly continued in 2021. As a result of a long-term travel ban, the researchers and research fellows participated in fewer conferences and stays abroad than planned. Similarly, recruiting new employees for projects was more challenging, causing delays in some projects.

It is interesting to note that despite the difficulties the pandemic has brought with it, 2021 became Simula's best year in terms of the number of published works. In 2021, Simula's research featured in 123 articles in international journals, three books, 14 chapters in books and 93 peer-reviewed conference proceedings.

Throughout 2021, Simula's scientific employees supervised 15 PhD candidates and 33 master's students to successfully complete their degrees. In 2021, the 150th PhD candidate supervised by Simula defended their thesis. From 2001 to the end

From left: Håkon Kvale Stensland, Maria Korkunc, Ingolf Søreide, Mari G. Løchen, Kyrre Lekve (Deputy Managing Director), Ingvild Myhre (Chair of the Board), Aslak Tveito (CEO), Hilde Brunvand Nordvik, Pinar Heggernes. **Not pictured:** Petter Nielsen, Mats Lundqvist

of 2021, 156 doctoral candidates and 509 Master's students were supervised at Simula. In addition, over the summer of 2021, 26 summer interns were hired to work on various short-term projects.

The University of Oslo, which is an important partner, granted the majority of these degrees. In December 2021, the first doctoral candidate at TKD (Faculty of Technology, Art and Design) at Oslo Metropolitan University defended his dissertation. The candidate was employed and supervised at SimulaMet. Degrees have also been awarded by the University of Bergen and Technische Universität Berlin (Germany).

At the end of 2021, Simula Innovation (SI) was a co-owner of 35 start-up companies with a total of 410 employees. In its second year, Simula Consulting experienced strong growth, expanding from two to seven employees and a fivefold increase in revenue.

Personnel and Health, Safety & Environment

At the end of 2021, the Simula Group had 209 employees, with 177 in full-time positions and 32 working in part-time positions. Of these, 141 were men, and 68 were women comprising 97 Norwegians and 112 foreign nationals. 91 were employed as research fellows, with 44 postdoctoral positions and 47 PhD students. In addition, there were 32 external PhD students under the supervision of Simula researchers. Beyond these research fellow positions, Simula does not practice temporary employment for researchers with their main position at Simula. A doctorate is required to obtain a permanent research position at Simula.

SRL had 104 employees at the end of the year, with 91 engaged in full-time positions and 13 part-time positions. Of these, 69 were men and 35 women.

Simula aims to maintain its strong focus on HSE. Absence due to illness was 1,5% for the Group and 1,2% for SRL in 2021. The Group works actively to keep sick leave at low levels. There were no reports of occupational illness or accidents during the year.

The Covid-19 pandemic brought completely new challenges for the work with HR and HSE for Simula. Simula was quick to facilitate home office for the employees. HR introduced routines to follow up the individual employee, especially new employees with a limited social network in Norway. HR also ensured that the necessary equipment was transported home to new employees. Some employees have reported that they find the work situation demanding. Simula tries to facilitate as much as possible to meet individual needs. Significant efforts have also been made to continuously inform employees about both national guidelines and Simula's accommodations to these guidelines. In order to adapt to the new work situation, it has been necessary to find new ways of facilitating interactions. For example, the traditional "Cake Thursday" was made digital, to great success.

HSE-related incidents are reported at each board meeting, including regular updates on employee welfare, employee surveys and implemented measures in response to the pandemic. Although no significant adverse effects on HSE have been detected due to the pandemic, it cannot be ruled out that effects may occur in the longer term.

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

Equal Opportunities and Integration

The Group works to promote the purpose of the Discrimination Act by promoting gender equality, ensuring equal opportunities and rights and preventing discrimination in the business. As of the financial year 2020, Norwegian employers and public authorities have a duty to work with equality and non-discrimination and account for this work and report the actual situation. The report can be found under the section «Gender equality report, social responsibility and working environment».

The Simula Group represents 41 different nations, and 54% of the Group's employees come from countries outside Norway. Simula offers Norwegian courses, social events, and support related to visas, taxes, housing, and other administrative matters.

By the end of 2021, the proportion of female scientific researchers, meaning the average of PhD students, postdoctoral fellows and researchers in permanent positions, was 26%. The proportion of female researchers in permanent positions was 20%, and among PhD students and postdoctoral fellows, the proportion was 30% and 30%, respectively. Simula's strategy moving forward for the period 2018–2028 aims to achieve a 40% share of women in the Simula Group (at the end of 2021, this share of women was 33%).

Simula will continue to work actively to improve the gender balance in the Group through targeted planning. To achieve the goal of 40% female employees by 2028, Simula will continue to focus on measures for recruiting new, talented female candidates and the development and adaptation of work situations for qualified women who Simula already employs.

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 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 assets, a write-down is performed. There is also some currency risk related to EU projects in which Simula participates. In total, the Board nevertheless considers the financial risk as low. Credit risk and liquidity risk are also low. The Board concludes that risks to the organisation are generally low.

Financial Performance

In its 20th year of operation, the Group had a turnover of NOK 267 million, an increase of 4% from the previous year. The budgeted income for the Group was 290 million. The reason why revenues are lower than budgeted is mainly due to delays and postponements of planned activities due to the Covid-19 pandemic. The operating profit was NOK 12 million against a budgeted operating profit of NOK 10.3 million. The Covid-19 pandemic has led to a generally lower cost level in 2021. The annual result was NOK 17.4 million in 2021.

SRL AS had total revenue of NOK 153 million in 2021. External project funding totalled NOK 91 million. Net profit for the year was NOK 10.7 million, which was transferred to other equity. Equity in SRL constitutes NOK 83.8 million, corresponding to 65% of the total assets equity ratio.

Simula Learning AS (SL, previously SSRI) had total operating revenue of NOK 17.5 million in 2021, and the annual result was a loss of NOK 2.2 million.

Simula Innovation AS (SI) had total operating revenue of NOK 2 million, total financial items were NOK 6.3 million, with a net profit after tax of NOK 3.2 million in 2021.

The total operating revenue of Simula UiB AS was NOK 33.3 million in 2021, with a net profit after tax of NOK 1.1 million.

The operating revenue of Simula Metropolitan Centre for Digital Engineering AS (SimulaMet) was NOK 72.2 million, with a net profit after tax of NOK 4.7 million in 2021.

Simula Consulting AS's operating revenues were NOK 15.4 million, with a net profit after tax of NOK 1.5 million in 2021.

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 2021, Simula was active in the management of or in the role of research partner in eleven EU-funded projects. Simula is generally successful at securing project funding.

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

The Board has been informed that Simula has taken out liability insurance for the Board, with an upper limit of NOK 20 million. Information on the main features of the insurance coverage has been provided to all board members.

Simula's Board had four meetings in 2021. The Board would like to thank all employees for their contribution throughout the year.

Oslo, 8 March 2022

Company overview 2021

Simula is led by managing director Professor Aslak Tveito and today comprises six companies spread over three locations in Norway. Simula Research Laboratory (SRL) is the parent company, with five daughter companies that have been established to expand research, education, and innovation activities.

Simula Research Laboratory (SRL)

Deputy managing director: Kyrre Lekve
Location: Oslo
Ownership: 100% Norwegian Ministry of Education and Research

The departments of the mother company concentrate on research and the education of graduate students within the ICT fields of software engineering and scientific computing. Innovation activities across the group, including the Simula Garage, are managed by SRL.

Research Directors:
Are Magnus Bruaset and Vegard Vinje

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: Ada Johanne Ellingsrud
- Dept. of Validation Intelligence for Autonomous Software Systems (VIAS) – Dept. Head: Arnaud Gotlieb

Simula UiB

Director: Kjell Jørgen Hole
Deputy director: Mari G. Løchen
Location: Bergen
Ownership: 51% Simula Research Laboratory, 49% University of Bergen (UiB)

Simula UiB specialises in cybersecurity, with an emphasis on cryptography and information theory. Simula UiB is based at the Department of Informatics at UiB.

Research Director:
Øyvind Ytrehus

Research Sections:

- Cryptography Section – Section Head: Håvard Raddum
- Information Theory Section – Section Head: Eirik Rosnes

Simula Metropolitan Center for Digital Engineering (SimulaMet)

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

SimulaMet opened in 2018 and is responsible for Simula's research activities in communication systems, machine learning and IT management. In addition to conducting research, SimulaMet also educates and supervises PhD and Masters's students at Oslo Metropolitan University and contributes to innovation in society through collaboration projects, startup companies and licensing of research results. SimulaMet is located at Oslo Metropolitan University.

Research Director:
Sven-Arne Reinemo

Research Departments:

- IT Management – Dept. Head: Magne Jørgensen
- Mobile Systems and Analytics (MOSAIC) – Dept. Head: Özgü Alay
- Machine Intelligence Department (MIND) – Dept. Head: Evrim Ataman
- Centre for Resilient Networks & Applications (CRNA) – Centre leader: Ahmed Elmokashfi
- Holistic Systems Department (HOST) – Dept. Head: Pål Halvorsen
- EDOS - Effektiv Digitalisering av Offentlig Sektor – Center leader: Magne Jørgensen

Simula School of Research and Innovation (SSRI)[1]

Director: Marianne Aasen
Location: Oslo
Ownership: 72% Simula Research Laboratory, 14% Equinor, 9% Bærum Municipality, 7% Telenor

SSRI educates tomorrow's ICT researchers and specialists at both Masters and PhD levels in collaboration with domestic and international academic institutions. SSRI also performs outreach and educational activities for both students and teachers in Bærum and Oslo.

Simula Innovation (SI)

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

SI manages Simula's investment portfolio and supports entrepreneurs from the start-up phase.

Simula Consulting (SC)

Director: Valeriya Naumova
Location: Oslo
Ownership: 100 % Simula Innovation

Simula Consulting provides high-quality R&D consulting services in the core competence areas of Simula.

[1] From 01.01.2022 SSRI changed it name to Simula Learning

Income statement

SRL				Simula Group	
2020	2021		Note	2021	2020
		OPERATING REVENUES			
155 117 747	152 832 102	Operating revenues	2	266 996 520	256 397 982
155 117 747	**152 832 102**	**TOTAL OPERATING REVENUES**		**266 996 520**	**256 397 982**
		OPERATING EXPENSES			
80 316 277	90 170 436	Salary and social costs	3-4	178 411 148	156 659 866
1 831 502	553 681	Depreciation	5	1 757 202	3 090 536
65 580 083	51 936 260	Other operating expenses		74 851 130	84 481 096
147 727 862	**142 660 377**	**TOTAL OPERATING EXPENSES**		**255 019 480**	**244 231 499**
7 389 885	**10 171 726**	**OPERATING PROFIT**		**11 977 040**	**12 166 483**
		FINANCIAL ITEMS			
57 297	3 799	Other interest income		623 094	308 485
2 989 911	1 494 491	Other financial income		9 276 890	15 413 086
0	0	Write-down of shares		2 749 871	6 025 017
44 153	95 305	Other interest expenses		101 245	77 056
194 639	743 538	Other financial expenses		1 135 108	311 631
2 808 415	**659 446**	**NET FINANCIAL ITEMS**		**5 913 760**	**9 307 867**
10 198 301	**10 831 172**	**PROFIT BEFORE TAX**		**17 890 800**	**21 474 350**
63 863	132 063	Tax	7	540 075	262 294
10 134 438	**10 699 109**	**NET PROFIT**		**17 350 725**	**21 212 056**
0	0	Minority interest		2 257 656	4 231 920
10 134 438	10 699 109	Profit after minority interest		15 093 069	16 980 136
		ALLOCATION OF THE YEAR'S NET PROFIT			
10 134 438	10 699 109	Transferred to other equity			
10 134 438	**10 699 109**	**TOTAL ALLOCATED**			

Balance sheet - assets

SRL				Simula Group	
2020	2021		Note	2021	2020
		ASSETS			
		FIXED ASSETS			
166 237	94 681	Deferred tax assets		94 681	166 237
166 237	**94 681**	**Total intangible assets**		**94 681**	**166 237**
		TANGIBLE FIXED ASSETS			
229 683	8 231 040	Furniture, fixtures, equipment	5	10 694 128	3 748 130
229 683	**8 231 040**	**Total tangible fixed assets**		**10 694 128**	**3 748 130**
		FINANCIAL FIXED ASSETS			
36 805 583	37 020 109	Investments in subsidiaries	8	1 316 075	1 316 075
0	0	Loans to group companies		0	2 798 629
0	0	Investments in shares	9	56 430 822	48 196 020
0	810 047	Other receivables		1 051 559	2 000 000
36 805 583	**37 830 156**	**Total financial fixed assets**		**58 798 456**	**54 310 724**
37 201 503	**46 155 877**	**TOTAL FIXED ASSETS**		**69 587 265**	**58 225 091**
		CURRENT ASSETS			
		RECEIVABLES			
6 338 519	13 118 488	Account receivables		30 393 030	15 752 230
13 965 834	12 799 231	Other receivables		27 877 622	28 107 338
20 304 353	**25 917 719**	**TOTAL RECEIVABLES**		**58 270 652**	**43 859 568**
		INVESTMENTS			
21 607 402	28 981 548	Market-based funds		59 122 200	21 607 402
0	0	Market-based bonds		17 139 808	51 347 397
21 607 402	**28 981 548**	**Total investments**		**76 262 008**	**72 954 799**
39 086 043	**27 784 802**	**Bank deposits**	10	**68 761 302**	**77 149 855**
80 997 798	**82 684 069**	**TOTAL CURRENT ASSETS**		**203 293 962**	**193 964 222**
118 199 301	**128 839 945**	**TOTAL ASSETS**		**272 881 227**	**252 189 313**

Balance sheet - equity and liabilities

SRL				Simula Group	
2020	2021		Note	2021	2020
		EQUITY AND LIABILITIES			
		EQUITY			
		Paid-in equity			
1 200 000	1 200 000	Share capital	11-12	1 200 000	1 200 000
0	0	Premium		0	0
1 200 000	**1 200 000**	**TOTAL PAID-IN EQUITY**		**1 200 000**	**1 200 000**
		RETAINED EARNINGS			
71 920 509	82 619 618	Other equity	12	140 664 087	125 141 784
0	0	Minority interests	12	25 552 338	23 294 682
71 920 509	82 619 618	Total retained equity		166 216 425	148 436 466
73 120 509	**83 819 618**	**TOTAL EQUITY**		**167 416 425**	**149 636 466**
		LIABILITIES			
		OTHER LONG TERM DEBT			
0	0	Other long term debt	14	13 528 868	14 000 000
0	**0**	**TOTAL LONG TERM DEBT**		**13 528 868**	**14 000 000**
		CURRENT LIABILITIES			
11 556 322	6 082 048	Accounts payable		8 628 210	20 842 812
0	0	Tax payable	7	39 286	198 431
4 287 044	6 488 720	Public duties payable		13 408 380	11 575 167
29 235 428	32 449 560	Other current liabilities		69 860 058	55 936 437
45 078 793	**45 020 328**	**Total current liabilities**		91 935 934	88 552 847
45 078 793	**45 020 328**	**TOTAL LIABILITIES**		105 464 802	102 552 847
118 199 301	**128 839 945**	**TOTAL EQUITY AND LIABILITIES**		272 881 227	252 189 313

Oslo, 31.12.2021 / 08.03.2022 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	Petter Nielsen Board member	Maria Korkunc Board member	Mari Garaas Løchen Board member	Håkon Kvale Stensland Board member

Notes to the financial statements

Note 1 Accounting principles

The financial statement has 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 criteria have been applied to the classification of current and long-term liabilities.

Fixed assets are valued at acquisition 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 Learning (SL), Simula Innovation (SI), Simula Metropolitan Center for Digital Engineering AS (SimulaMet), Simula Consulting AS and Simula UiB. Simula Research Incorporated is owned with 100% but is not included in the consolidated financial statements. The consolidated financial statements are prepared as if the Group were one economic entity. Transactions and balances between group companies are eliminated.

Note 2 Operating revenue

	SRL		SRL Group	
	2021	2020	2021	2020
Research funding	56 452 000	56 580 000	71 646 000	71 805 000
Subsidies from the Research Council of Norway, EU, etc.	89 710 796	78 778 218	171 077 085	159 946 905
Other income	6 669 306	19 759 529	24 273 435	24 646 077
Total	**152 832 102**	**155 117 747**	**266 996 520**	**256 397 982**

Note 3 Payroll costs, number of employees, remunerations, employee loans and auditor's fees

	SRL		SRL Group	
Salary and social costs	2021	2020	2021	2020
Salary	69 928 439	49 096 424	139 117 305	122 204 226
Social security	10 191 041	6 867 186	21 017 466	17 616 052
Pension costs	6 560 136	5 833 100	13 532 809	12 685 562
Other benefits	2 443 331	2 543 277	4 743 568	4 154 026
Personnel costs re-invoiced group	1 047 489	15 976 290	-	-
Total	**90 170 436**	**80 316 277**	**178 411 148**	**156 659 866**
Number of full-time equivalents	89	55	176	145

Remuneration paid to senior company officers	**Managing director**	**Board of directors**
Salary	2 982 320	541 400
Pension expenses	192 788	-
Other remuneration	307 292	-
Total remuneration	**3 482 400**	**541 400**

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	118 000	Statutory auditing services	195 600
Other services	127 800	Other services	46 500
Other services	**245 800**	**Total auditor's fees**	**242 100**

The auditor's fee is stated exclusive of VAT

Note 4 Pension

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.

In 2021, the Simula Group switched from a defined benefit scheme in SPK to a private defined contribution pension.

Note 5 Fixed assets

SRL

Fixed assets	Computer	Furnishings, equipment, etc.	Total fixed
Acquisition costs as of 01.01	2 924 771	12 356 229	15 281 000
Additions	4 479 956	4 075 083	8 555 039
Disposals	2 263 399	12 306 651	14 570 050
Acquisition cost as of 31.12	**5 141 328**	**4 124 661**	**9 265 989**
Culmulative depreciation as of 31.12	-3 174 952	-12 430 047	-15 604 999
Disposals	2 263 399	12 306 651	14 570 050
Book value as of 31.12	4 229 775	4 001 265	8 231 040
Year's depreciation	**450 855**	**102 826**	**553 681**

SRL Group

Fixed assets	Computer	Furnishings, equipment, etc.	Total fixed
Acquisition costs as of 01.01	2 934 147	18 619 103	21 553 250
Additions	4 628 118	4 075 083	8 703 201
Disposals	2 263 399	12 306 651	14 570 050
Acquisition cost as of 31.12	**5 298 866**	**10 387 535**	**15 686 401**
Culmulative depreciation as of 31.12	-2 973 589	-16 588 734	-19 562 323
Disposals	2 263 399	12 306 651	14 570 050
Book value as of 31.12	4 588 676	6 105 452	10 694 128
Year's depreciation	**893 485**	**863 717**	**1 757 202**

The economic life of operating assets is calculated as:

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

Note 6 Rental and leasing contracts

The company has entered into two leasing agreements concerning photocopiers and coffee machines. This year's cost is NOK 398.162

The company relocated from Fornebu to Kristian Augusts gate 23 in downtown Oslo in 2021. The lease is for 15 years.

Note 7 Tax

Simula Research Laboratory AS is taxable for the part of the business that concerns contract research. The subsidiary Simula Learning AS does not conduct taxable business. The subsidiaries Simula Innovation AS and Simula Consulting AS are taxable. The subsidiaries Simula Metropolitan Center for Digital Engineering AS and Simula UiB AS are liable to tax on income from contract research.

	SRL		SRL Group	
	2021	2020	2021	2020
Taxation for the year consists of:				
Tax payable	60 507	230 100	468 519	428 531
Change in deferred tax	71 556	-166 237	71 556	-166 237
Total tax expense	**132 063**	**63 863**	**540 075**	**262 294**
Tax payable for the year is calculated as follows:				
Profit before tax*	10 831 172	10 198 301	21 718 132	20 615 569
Permanent differences	-7 303 566	-8 736 844	-19 109 151	-21 701 831
Change in temporary differences	-3 252 573	-415 550	-3 134 336	441 406
Deficit to carry forward	-	-	-	-
Deficits and differences that are not included in the basis	-	-	2 654 987	2 592 725
Basis for taxable contract research	275 033	1 045 907	2 129 632	1 947 869
Taxable income	**275 033**	**1 045 907**	**2 129 632**	**1 947 869**
Temporary differences:				
Other differences	-1 650 000	-1 975 000	-1 628 010	-1 947 512
Fixed assets	-2 653 675	-5 581 248	-3 077 456	-5 701 342
Loss carryforward	-	-	-5 620 363	-5 429 198
Write-down of shares	-	-	-1 220 754	-1 220 754
Total basis for deferred tax asset	-4 303 675	-7 556 248	-11 546 583	-14 298 806
Deferred tax liability/asset	-946 809	-1 662 375	-2 540 248	-3 145 737
Unrecognised deferred tax liability	-852 128	-1 496 138	-2 445 567	-2 979 500
Recognized tax liability	**-94 681**	**-166 237**	**-94 681**	**-166 237**
Tax payable in the balance sheet:				
Tax payable on the profit of the year	60 507	230 100	468 519	428 531
Tax payable on group contributions paid	-60 507	-230 100	-429 233	-230 100
Total tax payable in the balance sheet	**-**	**-**	**39 286**	**198 431**

In 2021, the company has had income from contract research corresponding to 4.4% of turnover.
* The line "Profit before tax expense" contains only profit from taxable entities.

Note 8 Subsidiaries, associates, etc.

	Acquired	Office	Country	Share
Simula Innovation AS	04/05/2004	Oslo	Norway	100%
Simula Learning AS	08/05/2007	Oslo	Norway	72.3%
Simula UIB AS	17/12/2015	Bergen	Norway	51%
Simula Metropolitan CDE AS	21/11/2017	Oslo	Norway	51%
Simula Consulting AS	07/11/2019	Oslo	Norway	100%

The company has made a net group contribution to SI of NOK. 214 526,-- which is booked as an increased cost price for the shares.

	Result	Equity 31/12
Simula Innovation AS	3 173 173	62 203 879
Simula Learning AS	-2 151 307	12 753 465
Simula UIB AS	1 124 527	17 928 094
Simula Metropolitan Center for Digital Engineering AS	4 699 521	27 007 323
Simula Consulting AS	1 481 727	2 408 080

Non-consolidated subsidiaries:	Cost	Result	Equity 31/12
Simula Research Laboratory Inc., owned 100% by SRL	1 316 075	0	USD 150 000

Note 9 Securities and shares in other enterprises, etc

	Quantity	Face value per share	Share-holding	Cost price
Investment in subsidiaries				
Simula Consulting AS	1 000	300	100.0 %	3 000 000
Total investment in subsidiaries				**3 000 000**
Other share investments				
24SevenOffice Group AB	50 923			848 549
Adline Professional AS	5 244	1	5.7 %	1 587 320
AlphaEntrance AS	13 400	1	6.9 %	999 975
Augere Medical AS	19 430	1	22.8 %	2 258 930
Blueware corp.	334 319	USD 0 0001	1.4 %	7 000 000
Caplist AS	1 215	1	3.4 %	499 790
Celerway Communications AS	15 250	1	18.2 %	3 009 168
Coupler AS	882	1	2.9 %	1 000 000

	Quantity	Face value per share	Share-holding	Cost price
Other share investments				
Edgefolio UK Limited	5 771	GBP 1 00	5.2 %	1 451 243
Entire Body AS	111 111	15	9.8 %	3 000 025
EYR Medical AS	22 744	0.3	4.5 %	3 033 440
Fabriscale Technologies AS	19 983	1	26.6 %	4 010 410
Forzasys AS	33 000	0.34	30.0 %	1 528 065
Future Ready AS	1 875	1	4.0 %	500 000
Futureworks AS	3 351	1	10.0 %	1 000 000
Imerso AS	891	10	10.7 %	1 615 925
Insilicomed Inc, USA	131 945	USD 1 8		1 220 755
Investory Onlineplattform GmbH	3 318	EUR 1	4.0 %	1 104 440
KVM AS	1 137	3	11.4 %	3 412
LeadX AS	6 757 605	0.001	13.9 %	2 250 000
Leid AS	8 737	1	9.1 %	1 500 000
MemoScale AS	50 669	1	22.8 %	2 749 895
N-Abel AS	15 675	1	32.8 %	2 090 000
Organos Inc.	510 000		10.0 %	22 048
Qbee AS	934	1	17.4 %	2 998 618
Quine AS	5 809	1	10.1 %	700 267
Spoortz Holding AS	76 923	13.00	0.7 %	999 999
StalkIt AS	69	1000	2.8 %	1 001 209
Storeshop AS	67 286	1.75	10.1 %	1 849 760
Testify AS	44 433	1	30.0 %	1 427 117
Tipio AS	90 498	0.1	7.1 %	1 000 000
Unloc AS	2 504	1	3.8 %	1 499 754
Vendu AS	473 188	0.01	5.8 %	1 500 000
Volur AS	160	15	4.0 %	1 000 000
Write-down of shares				14 583 534
Total investment in associated companies				**43 676 580**
Pre-seed investments on behalf of Innovation Norway AS:				
Adline Professional AS	2 839	1	3.7 %	752 534
AlphaEntrance AS	9 999	1	5.2 %	1 500 000
Arribatech Group AS	277 800			500 000
Entire Body AS	33 334	15	2.9 %	500 010
EYR Medical AS	6 521	0.3	1.5 %	1 499 830
Fabriscale Technologies AS	3 223	1	4.3 %	1 999 793
Future Ready AS	638	1	1.4 %	250 000
LeadX AS	1 698 446	0.001	3.5 %	750 000
Leid AS	1 609	1	1.7 %	750 357
Memoscale AS	17 410	1	7.8 %	1 000 000
Quine AS	825	1	1.4 %	750 750
Spoortz Holding AS	76 923	13	0.7 %	999 999
StalkIt AS	69	1000	2.8 %	1 001 209
Unloc AS	630	1	1.0 %	499 760
Total pre-seed investments				**12 754 242**
Total investments in associates				**56 430 822**

Note 10 Bank deposits

	SRL	SRL Group
Restricted tax withholdings total:	3 543 707	6 755 359

Note 11 Share capital and shareholders

Share capital	Quantity	Face value	Capitalized
Ordinary shares	800	1500	1 200 000
Total	800		1 200 000

The company's shareholders as of 31. 12	Quantity	Stake
The Norwegian state represented by the Ministry of Education and Research	800	100.0 %
Total no. of shares	800	100.0 %

Note 12 Equity

SRL	Share capital	Other equity	Total
Equity as of 01. 01	1 200 000	71 920 509	73 120 509
Profit/loss for the year		10 699 109	10 699 109
Equity as of 31. 12	1 200 000	82 619 618	83 819 618

SRL Group	Share capital	Other equity	Minority	Sum
Equity as of 01. 01	1 200 000	125 141 784	23 294 682	149 636 466
Other changes	-	429 234	-	429 234
Profit/loss of the year	-	15 093 069	2 257 656	17 350 725
Equity as of 31. 12	1 200 000	140 664 087	25 552 338	167 416 425

Note 13 Balances and transactions between group companies

	2021	2020
Receivable from SI AS	208 287	218 473
Receivable from SimulaMet	73 247	275 414
Receivable from SC	1 131 745	320 617
Payable to SI AS	855 757	1 043 377
Payable to SL	174 213	1 728 681
Payable to Simula UIB	12 736	102 750
Payable to SC	9 520	0
Payable to SimulaMet	353 612	124 750
Salary costs refunded to SL	2 292 218	15 738 837
Sale of services, etc to SI	653 610	650 000
Sale of services, etc to SL	3 325 179	3 146 570
Sale of services, etc to Simula UIB	1 648 735	1 250 000
Sale of services, etc to SimulaMet	3 290 884	2 739 792
Sale of services, etc to SC	5 040 467	685 830
Purchases of services, etc from SI	1 520 189	2 287 835
Purchases of services, etc from SL	328 488	3 000 000
Purchases of services, etc from Simula UIB	12 736	0
Purchases of services, etc from SimulaMet	13 893 437	19 223 942
Purchases of services, etc from SC	247 338	856 215

Note 14 Receivables and liabilities

	SRL		SRL Group	
Long-term debt due in more than five years	**2021**	**2020**	**2021**	**2020**
Pre-seed funds from Innovasjon Norge AS	-	-	13 528 868	14 000 000
Total	**-**	**-**	**13 528 868**	**14 000 000**

Note 15 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.

Cash flow statement

SRL			SRL Group	
2020	2021		2021	2020
		Cash flow from operating activities		
10 134 438	10 699 109	Net profit for the year	17 350 725	21 212 056
1 831 502	553 681	Depreciation and write-downs	1 757 202	3 090 536
-	-	Change in value of shares	2 749 871	6 025 017
27 025 004	-6 449 984	Change in receivables	-10 664 014	11 140 940
-17 745 515	-31 894	CHANGE IN CURRENT LIABILITIES	3 383 087	9 101 491
21 245 429	**4 770 912**	**NET CASH FLOW FROM OPERATING ACTIVITIES**	**14 576 871**	**50 570 040**
		CASH FLOW FROM INVESTING ACTIVITIES		
-	-	Changes in connection with arrival/disposal of subsidiary		3 000 000
-	-8 555 037	Net investments in operating assets	-8 703 199	-3 414 226
-1 708 232	-214 526	Net investments in/sale of shares	-10 984 674	-12 314 173
-1 708 232	**-8 769 563**	**NET CASH FLOW FROM INVESTING ACTIVITIES**	**-19 687 873**	**-12 728 399**
		CASH FLOW FROM FINANCING ACTIVITIES		
-	-	Repayment of loans	-471 132	-
-	-	PAID IN EQUITY	429 234	224 698
-166 237	71 556	Change in deferred tax/tax benefit	71 556	-166 237
-166 237	**71 556**	**NET CASH FLOW FROM FINANCING ACTIVITIES**	**29 658**	**58 461**
19 370 960	-3 927 095	Net cash flow for the year	-5 081 344	37 900 102
41 322 485	60 693 445	CASH HOLDINGS 01.01	150 104 654	112 204 552
60 693 445	56 766 350	Cash holdings 31.12	145 023 310	150 104 654
		THIS CONSISTS OF:		
17 556 547	-11 301 241	Change bank deposits	-8 388 553	-15 261 708
1 814 413	7 374 146	Changing financial current assets	3 307 209	53 161 810
19 370 960	**-3 927 095**	**TOTAL SUM**	**-5 081 344**	**37 900 102**

LUNDES Revisjonskontor DA

Til generalforsamlingen i
SIMULA RESEARCH LABORATORY AS

UAVHENGIG REVISORS BERETNING

Uttalelse om revisjonen av årsregnskapet

Konklusjon
Vi har revidert årsregnskap til SIMULA RESEARCH LABORATORY AS som består av:

- selskapsregnskapet, som består av balanse per 31. desember 2021, resultatregnskap og kontantstrømoppstilling for regnskapsåret avsluttet per denne datoen og noter til årsregnskapet, herunder et sammendrag av viktige regnskapsprinsipper, og
- konsernregnskapet, som består av balanse per 31. desember 2021, resultatregnskap og kontantstrømoppstilling for regnskapsåret avsluttet per denne datoen og noter til årsregnskapet, herunder et sammendrag av viktige regnskapsprinsipper.

Etter vår mening

- oppfyller årsregnskapet gjeldende lovkrav, og
- gir selskapsregnskapet et rettvisende bilde av selskapets finansielle stilling per 31. desember 2021, og av dets resultater og kontantstrømmer for regnskapsåret avsluttet per denne datoen i samsvar med regnskapslovens regler og god regnskapsskikk i Norge, og
- gir konsernregnskapet et rettvisende bilde av konsernets finansielle stilling per 31. desember 2021, og av dets resultater og kontantstrømmer for regnskapsåret avsluttet per denne datoen i samsvar med regnskapslovens regler og god regnskapsskikk i Norge.

Grunnlag for konklusjonen
Vi har gjennomført revisjonen i samsvar med de internasjonale revisjonsstandardene International Standards on Auditing (ISA-ene). Våre oppgaver og plikter i henhold til disse standardene er beskrevet nedenfor under Revisors oppgaver og plikter ved revisjon av årsregnskapet. Vi er uavhengige av selskapet slik det kreves i lov, forskrift og International Code of Ethics for Professional Accountants utstedt av The International Ethics Standards Board for Accountants (IESBA-reglene), og vi har overholdt våre øvrige etiske forpliktelser i samsvar med disse kravene. Innhentet revisjonsbevis er etter vår vurdering tilstrekkelig og hensiktsmessig som grunnlag for vår konklusjon.

Øvrig informasjon
Styret og daglig leder er ansvarlig for informasjonen i årsberetningen. Vår konklusjon om årsregnskapet ovenfor dekker informasjon i årsberetningen.

I forbindelse med revisjonen av årsregnskapet er det vår oppgave å lese årsberetningen. Formålet er å vurdere hvorvidt det foreligger vesentlig inkonsistens mellom årsberetningen og

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årsregnskapet og den kunnskap vi har opparbeidet oss under revisjonen av årsregnskapet, eller hvorvidt informasjonen i årsberetningen ellers fremstår som vesentlig feil. Vi har ingenting å rapportere i så henseende.

Basert på kunnskapen vi har opparbeidet oss i revisjonen, mener vi at årsberetningen

- er konsistent med årsregnskapet og
- inneholder de opplysninger som skal gis i henhold til gjeldende lovkrav.

Ledelsens ansvar for årsregnskapet
Ledelsen er ansvarlig for å utarbeide årsregnskapet og for at det gir et rettvisende 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 og konsernets 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 avviklet.

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 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

Oslo, den 8. mars 2022

Erik A. Bell
Statsautorisert revisor

Gender equality, social responsibility and working environment

Gender balance at Simula

The Simula Group consists of six companies per 31.12.2021: Simula Research Laboratory (SRL), Simula Metropolitan Center for Digital Engineering (SimulaMet), Simula UiB, Simula School of Research and Innovation (SSRI), Simula Innovation, and Simula Consulting. The Group has a total of 209 employees, of whom 190 are in full-time positions. SRL has a total of 104 employees, of whom 98 have Simula as their main employer. Gender balance in both the Group and in SRL specifically is shown in Table 1 as the number of male and female employees who have Simula as their main employer, while Table 2 shows gender balance according to other employment variables. To ensure employees' anonymity, specific job titles have been grouped into larger categories, such that each comprises at least five men and five women.

Due to the nature of Simula's work, many employees are hired either in temporary or part-time positions. Temporary recruitment positions are typically those occupied by PhD candidates and postdoctoral fellows. The adjunct research scientist category describes part-time scientific employees whose primary employment is elsewhere. The total number of employees in such positions can vary from year to year depending on the amount of externally funded projects in progress but has remained relatively stable over time.

Table 1: Gender balance amongst employees that have Simula as their main employer. Job categories with less than five women and five men are not reported and are marked with a dash (-).

Job categories at Simula	Simula Group		SRL	
	No. women	No. men	No. women	No. men
Total	65	125	34	64
Research positions	12	49	7	23
Recruitment positions	27	66	13	33
Administrative positions	26	10	14	8
Group management	7	7	-	-

Job categories in Table 1:

- Research positions: includes researcher I, II and III positions (not including adjunct research scientists), and engineers.
- Recruitment positions: trainees, PhDs, postdocs.
- Administrative positions: HR, finance, communication, IT operations, management.
- Group management: includes the CEO, company directors and managers who are part of the management group. Members of group management have their main position within either administration or research, and have thus also been counted in those job categories.

Table 2: Gender balance in terms of other employment variables

	Temporary staff		Actual part-time		Involuntary part-time		Parental leave	
	Women	Men	Women	Men	Women	Men	Women	Men
Simula Group	35	87	7	25	-	-	15	13
SRL	18	41	-	-	-	-	14	10

The groupings in Table 2 are defined as follows:

- Temporary staff: mainly recruitment positions (PhDs and postdocs), adjunct professor positions, interns and assistants/substitutes. Stated in numbers of employees.
- Actual part-time: includes both research and administrative employees at Simula. The majority of the employees in this category have positions with other employers that are relevant to the work they perform at Simula (e.g., these are mainly adjunct research scientist positions). Stated in numbers of employees.
- Involuntary part-time: we have no employees in part-time positions that wish to work more.
- Parental leave: stated in the number of weeks. The total number of weeks per gender is then divided by the number of women or men who have taken parental leave to show the average withdrawal per person of that gender.

Simula's work for equality and non-discrimination

Simula relies on the competence and motivation of skilled employees to achieve its goals. Recruiting highly qualified researchers from around the world means Simula has become an increasingly diverse workplace.

Simula's employees currently represent 41 different nationalities and 54% come from countries other than Norway (see Figure 1). In total, 26% of Simula's scientific staff are women (see Figure 2).

Figure 1: Simula is a diverse workplace. The figure shows the proportion of employees from different continents.

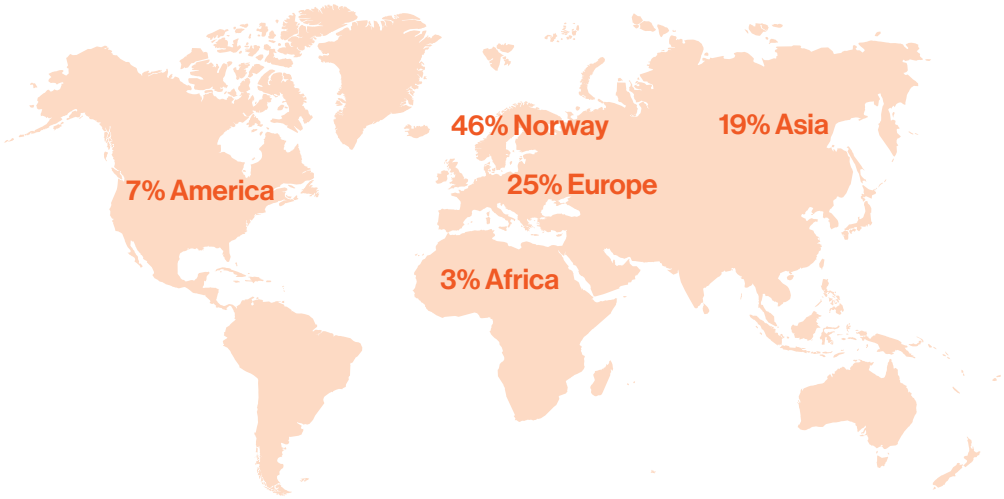
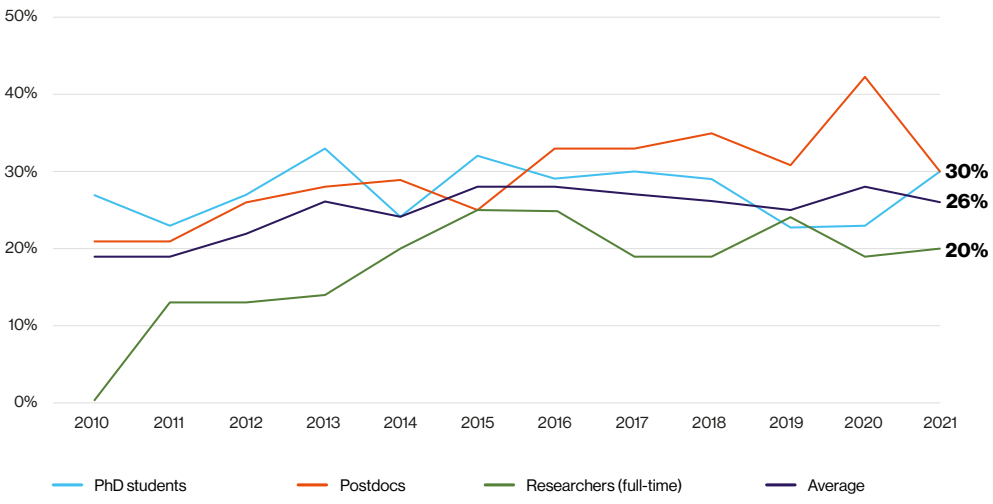


Figure 2: Proportion of women in scientific positions at Simula



General principles for gender equality and anti-discrimination

Working towards gender equality is firmly anchored in Simula's management approach, and in various strategies and guidelines:

- Simula has worked purposefully to recruit and cultivate female research talent for over 10 years. Simula's initial goal to increase the proportion of women in research positions to 25% was achieved in 2013. By 2028, Simula aims to have 40% of such positions filled by women.
- Extensive work in health, safety and environment (HSE) is carried out regularly. This involves health and safety representatives, the working environment committee, PhD forum, HR and the welfare committee. In addition, employee well-being surveys and broader working environment surveys are conducted regularly.
- The boards of directors in Simula companies receive regular reports on employee welfare, both routinely (for example, HSE reports to each board meeting) and regarding significant issues that may affect employees. Throughout 2021, the boards have been specifically updated on the consequences of the Covid-19 pandemic and accompanying measures for employees.
- Simula's culture document clearly describes our core values and expectations for a good and inclusive workplace; this document is published on the company website.
- Simula has clear guidelines to prevent all forms of harassment, with a corresponding notification system in place. In short: "Simula will not accept or tolerate any form of harassment, victimization or discrimination based on religion, gender, sexual orientation, age, nationality, physical disability or political views."

Practical procedures for equality and anti-discrimination

Simula works actively and deliberately with equality and non-discrimination, which are essential components of Simula's efforts to ensure good working conditions in practice. Responsibility for this work is shared across several functions, including health and safety representatives, the working environment committee, HR, managers at all levels, the directors, group management and the boards of directors. Formal decisions from the boards and the management group are implemented by the administration and often involve the cooperation of employee representatives (e.g., health and safety or trade union representatives). Information flow is ensured through regular meetings between department heads and selected administrative functions. In addition, all employees are responsible for safeguarding the Simula culture and contributing to an inclusive work environment. Employees also have a duty to make known any form of harassment they may encounter at work.

As a result of this extensive work over many years, Simula has developed several programmes that actively contribute to equality and non-discrimination. The current programmes and measures taken are described below.

Working environment

Quality assurance and continuous workplace development at Simula are facilitated by means of an internal inspection system that embraces health, safety and the working environment. The working environment committee strives to develop and maintain the quality of the working environment and to follow up on questions related to employee safety, health and welfare. The results of the working environment survey conducted in autumn 2018 were very good, showing improvements in most categories as compared to the 2014 survey and compared with the research-institute sector in general. Although this confirms that the working environment at Simula is good and that employees are satisfied, the work to follow up on the results in the individual units and in the Group as a whole continues. The next working environment survey is scheduled to be carried out in 2022.

Working conditions in 2021 were again affected by the Covid-19 pandemic. Employees were required to work from home for large parts of the year with some exceptions (for example, those requiring access to specialised equipment at the office). In 2020 and 2021 employees' home offices were equipped with extra screens, ergonomic chairs and so on, to ensure the best possible working conditions. Efforts were also made to facilitate physical and digital meeting places that helped to sustain social activity, in line with public health measures.

Facilitation of and opportunities to combine work and family life

Simula has several initiatives in place to facilitate a good work-life balance, including family life. With flexible working hours, employees are better able to combine a demanding career with activities and responsibilities outside of work. Simula has a 'baby bonus' scheme, giving new parents a bonus of NOK 25 000 and an additional four months' extension for employees in recruitment positions (PhDs and postdocs). Simula also recently established a sponsorship programme whereby employees can apply for support for organised leisure activities outside work. Such measures demonstrate Simula's desire to be a good workplace for all employees, regardless of their life situation.

Recruitment and professional development

Simula continuously works to attract, develop and retain talented researchers of diverse backgrounds. Simula's recruitment guidelines require qualified candidates of both sexes to be called in for an interview. The guidelines are regularly communicated to employees responsible for recruiting new researchers. For those recruited from abroad, Simula facilitates a quick and positive transition to the Norwegian workplace through administrative support, social activities and Norwegian language training, among other measures. Language training is also offered to the spouses/partners of new employees relocating to Norway.

Simula promotes career development by providing access to the professional and administrative resources necessary to establish oneself as a researcher. All employees are encouraged to sign up for courses and training opportunities that can contribute to their development as experts and leaders. Since 2016, several project managers have attended intensive leadership training programmes at internationally recognised institutions such as Stanford University, Harvard, the Wharton School and London Business School. Simula also arranges seminars for supervisors focused on relevant and challenging topics and offers similar training for PhD students and postdocs to develop the understanding and skills required as a supervisor; for example, a full-day leadership seminar commissioned by London Business School. The scheduled course offerings for 2021 were impacted by the public health and travel restrictions due to the pandemic. During periods when it was not possible to meet, the planned courses were conducted digitally.

Salary structure

Every second year, Simula conducts an evaluation of salary conditions in the organization. This was most recently conducted in 2021. The goal is twofold: to assess whether salary levels at Simula are competitive (external perspective) and if they reflect the individual's responsibilities and job category (internal perspective).

Throughout this process, we have considered similar positions (e.g., PhD students) and work of similar administrative contribution (e.g., human resources and communications staff). Additionally, individual assessments related to such variables as education, experience and individual contribution are conducted, as are any differences according to gender.

When calculating differences in wages between Simula employees, we have assessed fixed salaries and bonuses. Simula employees receive in-kind benefits (e.g. mobile phone and subscription, broadband at home and insurances); the base compensation package is the same for all employees regardless of job category. The wage conditions at Simula are then assessed and analysed in comparison to statistics from the Norwegian Association of Researchers (Forskerforbundet), Tekna and Statistics Norway. Deviations identified have been handled and corrected.

In the overview presented in Table 3, job categories are presented to show grouping of employees that deliver equal work of equal value[1]. However, due to the relatively small number of employees at Simula it was difficult to define meaningful subgroupings with enough individuals to report on salary differences (more than 5 individuals). In order to provide a more realistic and nuanced reporting of the salary comparison, we have used average years of experience following the completion of a Master's degree as a proxy for experience. In particular, we see that the category «scientific positions - intermediate level» gives the impression of a gender imbalance. However, each individual employee has been assessed on the basis of the criteria outlined above (experience,

[1] The guidelines from the Norwegian Directorate for Children, Youth and Family Affairs (Bufdir) regarding this reporting duty introduce the terms "equal work" and "work of equal value", as a method for categorizing positions within a company. These categories are then used to map salary differences within each category.

Table 3: Average number of years of experience by master's degree

Job category	Average years of experience (years since completing master's degree)		Differences in salary (men:women)
	Women	Men	
Research positions			
· Senior level	15 years	21 years	6%
· Intermediate level	6 years	9 years	18%
Recruitment positions	5 years	5 years	0%
Administrative positions	-	-	

contribution and level of responsibility) and no unreasonable differences were found. As such, we interpret this averaged difference in salary to result from the category being both small in number and very heterogeneous.

Administrative positions include the management, IT-services, caretaker services, reception, finance, HR and communication. In total the administration counts 36 employees. It is not adequate to present these figures as there are large variations in both the nature of the work and levels of responsibility, and when divided into equal work of equal value, the number in each category is much too small to report on. However, a similar individual analysis of the work in the administration has been carried out and it has shown that the individual's work is compensated according to the individual's experience, contribution and level of responsibility.

In this analysis, we have not included employees where Simula does not determine the salary level. This mainly applies to the Directors of the various companies where the respective boards determine the salary levels.

Promotion

Every year, Simula assesses scientific staff for promotion according to established criteria for each role. Those meeting the requirements are duly promoted.

Absence due to illness

Sick leave is generally low at Simula. In 2021, absence due to illness was 1.5% across the Group (1.2 % for SRL). Simula has an agreement with NAV (the Norwegian Labour and Welfare Administration) concerning "the inclusive workplace". Its purpose is to prevent and reduce absence related to illness, improve job attendance and the working environment, and minimise exclusion and withdrawal from working life. An action plan that focuses on how Simula addresses these matters is discussed with NAV on an annual basis.

Conflict management and work against harassment

Simula aims to ensure a safe and secure working environment in accordance with the Group's principles on culture in the workplace. As such, Simula shows consideration for employees' individual needs and does not accept or tolerate any form of harassment, expulsion or discrimination based on religion, gender, sexual orientation, age, nationality, disability or political views. Simula's guidelines for conflict resolution and notification encourage employees to take an active role in creating a 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.

Ethics

Maintaining high ethical standards is inherently valuable not only for Simula but also for each individual employee. The Group's Code of Ethics was developed to increase awareness of, and compliance with, the high ethical standards required of all employees. This 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 trust for collaborating with partners in research, as well as Norwegian society in general.

How Simula works for equality and anti-discrimination

Simula's work for gender equality and anti-discrimination is a continuous interaction between several key players in the Group, including the management, the board, the administration, employees and employee representatives. Simula's administration already bases much of this work on a 4-step working cycle:

1. Examine the risk of discrimination and obstacles to equality
2. Analyse causes
3. Implement measures
4. Evaluate results

In recent years, Simula has carried out a targeted process to identify discrimination and gender equality risks and to develop corresponding measures. Several of the recruitment measures established in the extension of this review, such as always interviewing at least one qualified candidate of each gender for a position, are now established practice.

In 2021, Simula has continued to work for equality and against discrimination. Selected examples from this work can be found in Table 4.

According to the new requirements from the Norwegian government the work for equality and anti-discrimination should be carried out through more active collaboration with employee representatives according to the statutory working method. Development of a structure that more clearly reflects this has begun and will be continued in 2022.

In 2022, we will conduct a joint working environment survey for the entire Simula Group. In connection with this work, we will assess whether there are particular areas or questions that we want to look into with regard to the working environment in general and diversity and discrimination in particular. We will do this review in collaboration with both safety representatives and the working environment committee to ensure a well-anchored process across the group.

Some of the measures for 2022 will be further developments of earlier initiatives. Many of these are organised under Simula's "HiddenFigures" project, which is part of the Research Council of Norway's "BalanseHub"[1] programme supporting cultural and structural changes that promote equality and gender balance in research institutions. HiddenFigures aims to achieve long-term gender balance and diversity by creating a management culture across Simula that is inclusive of researchers' different backgrounds and life situations. Through BalanseHub, Simula will also learn from other participants' projects, drawing on updated knowledge and proven practices to further the work with equality and anti-discrimination.

Once the pandemic ends, we will also be able to assess and reflect on the effect it has had on us both privately and professionally. In 2022, we will assess the need for organizational measures in the wake of the pandemic.

Additional measures for equality and anti-discrimination

In addition to continuing the measures mentioned above, new measures will be introduced. In 2021, Simula conducted a survey to understand more about employees' experience of diversity and inclusion at work. The results showed that the majority of Simula's employees experience the workplace as equal and inclusive, but that we still have areas for improvement. We will continue to work on identifying and evaluating measures that will provide a better workplace for all our employees.

Table 4: Selected examples of work with risk identification and initiative development

	Potential risk	Possible causes	Corresponding measures	Effect of measures
1.	Possible risk of slower professional advancement among female researchers.	Female researchers publish less and apply for fewer externally funded projects.	Develop a quality assurance process that supports all researchers in the grant application process.	Applications have received better evaluation scores; the gender dimension is not yet clear.
2.	Possible risk of the "leaky pipeline" known in academia - do we have good enough measures to ensure that we retain talented female researchers at senior levels in the organization?	Parts of the working environment are not sufficiently adapted to attract and retain the best researchers – regardless of gender, background or life situation.	Need for increased competence in the organization and knowledge of best practice. An application for a participation project in the BalanseHub network was thus prepared and submitted.	The project "Hideen Figures", a part of the BalanseHub network started 1/1/2021 (see below for details).
3	Possible risk of inconsistencies in the recruitment process.	Lack of overall training materials to support employees in the recruitment role.	Prepared training materials to achieve equal and proper treatment of applicants and at the same time ensure quality in all stages of the recruitment process.	We consider this a continuous process, and will regularly review the effect and identify new potential risks.
4	Possible risk that not all employees have an overview of the courses and development opportunities at Simula.	Communication about training offers does not always reach all employees.	Created Simula Academy, which has overall responsibility for professional development of all personnel. The Academy will hold regular courses (eg leadershiptraining and communication workshops), as well as commissioned seminars and guest lecturers who can provide insight into timely topics.	Simula Academy had its official opening on 01.01.22; we will assess its effect a later date.
5	Possible risk that employees returning from leave find it difficult to get back to work.	After longer period of leave, such as parental leave, employees need to be updated on what has happened both professionally and organizationally, and to recalibrate priorities and expectations for their work in light of their new situation (such as restricted worktime flexibility due to childcare responsibilities).	Introduced a routine for a "re-boarding conversation" between the immediate superior and employees returning from leave. This should facilitate a smoother transition ("re-boarding").	Measures initiated in the autumn of 2021. We will assess the effectiveness of these when we have sufficient data available.
6.	Risk that the pandemic-induced changes in working conditions have impacted employee productivity or well-being.	Employees were forced to work almost exclusively from home office for over two years. The impacts of this disruption (both positive and negative) on employee well-being and engagement, as well as on the overall productively and quality of Simula's deliverables, are not yet clear.	A test period in which each department can experiment with the expectations for employees to work in the office or be free to work remotely, in order to evaluated which general balance is best for the working environment, professional development, and productivity.	The test period started in the autumn of 2021 but was paused due to the implementation of national restrictions. Will restart as soon as possible.

[1] BalanseHub is a part of the Norwegian Research Council programme "BALANSE - Gender Balance in Senior Positions and Research Management".

Education and outreach activities

From left: Matteus Hager, Marianne Aasen, Elin Backe Christophersen, Mohmina Farooq

Simula School of Research and Innovation (SSRI) was established in May 2007. Since then, the company has been responsible for the education activities at Simula, with particular emphasis on researcher education.

SSRI has a lot to celebrate: from 2001 until the end of 2021, 156 doctoral students and 509 master's students have been supervised to completion at Simula. This was duly celebrated in the autumn, with many of the recent candidates who completed their doctoral degrees in 2020 and 2021 present. In 2021 alone, Simula's scientific staff supervised 15 candidates to complete their doctoral degrees and 33 students to complete their master's degrees.

Every year, SSRI hires bachelor students for summer internships. Between June and August 2021, 26 Norwegian students were distributed among the research departments at SRL, SimulaMet and Simula UiB. Some interns also taught at the summer school in Bærum, and some worked in start-up companies in the Simula Garage.

In addition to general administrative functions, SSRI also organised courses, seminars, and supervisor training tailored to Simula's graduate students and researchers.

The activity aimed at life-long learning was a focus area in 2021, including programming courses for teachers and contributions to increasing digital competence in other occupations. The Covid-19 pandemic affected the number of courses that could be delivered for teachers, as high infection rates impacted the activity in many schools. Nevertheless, SSRI experienced growth in this part of the business.

The specially adapted programming course aimed at teachers is a combination of an introduction to the programming language Python and teaching mathematics and science. In 2021, SSRI arranged courses for teachers in Viken county, Lillestrøm municipality, Lambertseter school in Oslo, and Tekna Realistene. In addition, SSRI held a total of 5 courses with 162 participants in topics including programming, computer technology, networks, AI and IT security for members of Tekna (not teachers), the Confederation of Norwegian Enterprises (NHO) and the Federation of Norwegian Industries (Norsk Industri).

SSRI participated in Bærum Municipality's summer school with a coding course for primary school children, and 120 students participated. In addition, 40 school children participated in a coding course at Simula during the autumn holiday.

As part of the Prepare project, SSRI recruits high-school students as ambassadors who visit local schools to inspire other students and increase their interest in technology and science. In 2021, there was less activity in Prepare, as the schools were strongly affected by the pandemic. However, two events were held in Arendal with 40 upper secondary school students. In 2021, in collaboration with the Aker companies' science centre, Engineerium, 180 students between the ages of 10-15 were taught programming while visiting Simula at Fornebu.

From 2022, SSRI will reorganise to focus on lifelong learning in digital competence. Researcher education, recruitment and career development will be organised in Simula Academy, a new unit at Simula.

SSRI in numbers 2021:

15
supervised to the completion of their PhD degree

33
students were supervised to the completion of their Master's degree

26
students held a summer internship across Simula

380
teachers participated in courses run by Kodeskolen

180
students between the ages 10-15 participated in courses run by Kodeskolen

Simula Metropolitan Center for Digital Engineering

Simula Metropolitan Center for Digital Engineering (SimulaMet) specialises in research and education within Communication Systems, Machine Learning and Artificial Intelligence, and IT management. The company is owned by Simula Research Laboratory AS (SRL) and the Oslo Metropolitan University (OsloMet).

SimulaMet was established in response to the needs of Norway, and more broadly of Europe, to strengthen research and education capacity in ICT and digitalisation. SimulaMet's mission is to conduct research in digital engineering at the highest international level, educate and supervise PhD and Master's students at OsloMet, and contribute to innovation in society through collaboration, start-up companies and licensing of research results.

SimulaMet started out with a small group of senior researchers in January 2018, with Professor Olav Lysne as director. As of 31 December 2021, a group of 65 people representing 24 different nationalities are formally affiliated with SimulaMet. Of these, 16 are PhD students, and 14 are postdoctoral fellows. In addition, the company has many collaborating partners and guests closely associated with the activities in the center.

Activities and research results

SimulaMet's primary goal is to generate research results at the highest level. Researchers at SimulaMet have authored books, published journals and conference publications, and supervised PhD and Master's candidates. In addition to teaching, the scientific staff organise workshops, conferences, industry seminars and summer schools, publish open data sets and source code, and are advisors and members of governmental boards and academies.

SimulaMet is now well established within its three core research areas: Communication Systems, Machine Learning and Artificial Intelligence, and IT management. The Norwegian Ministry of Local Government and Regional Development has given a mandate to fund two research centers at SimulaMet; Center for Resilient Networks and Applications (CRNA) and Effective Digitalization of Public Sector (EDOS).

CRNA conducts research on network robustness and security, focusing on security and vulnerability in communication infrastructures. CRNA studies how applications can continue operating at the best possible quality and security level, even when exposed to technical or human errors or deliberate malice. Among other things, the center produces an annual report on the state of the Norwegian mobile networks.

EDOS conducts surveys and analyses information on digitisation in the public sector. The research aims to provide knowledge about what leads to successful digitalisation in the public sector and disseminate knowledge that leads to higher efficiency and value creation.

Two departments at SimulaMet have their research focus on artificial intelligence and machine learning. The Department of Machine Intelligence (MIND) aims to advance the boundaries of machine learning and data mining by developing new methods and algorithmic solutions for the analysis of high-dimensional data in research and industry. The Department of Holistic System (HOST) aims to investigate and solve real-world problems in intelligent distributed systems by addressing challenges that cover all components of the entire system, from data collection to visualisation, explanation and the interpretation of the results.

Several research projects have been awarded funding from external sources. This enables the expansion of activities and strengthens collaboration with partners and industry, academia and public bodies. External funding sources include the Norwegian Ministry of Local Government and Regional Development, the Research Council of Norway and the EU's Horizon 2020 platform.

In 2021, SimulaMet's activities were affected by the Covid-19 pandemic, with limited opportunities to arrange and participate in conferences and summer schools. As a result, some planned summer schools have been postponed, and digital alternatives were established and implemented wherever possible.

Strategic partnership with OsloMet

A key role for SimulaMet is to be OsloMet's strategic partner in both research and PhD and Master's education within digital engineering. The partners collaborated on establishing a doctoral program in "Engineering Science" at OsloMet, with applications submitted from the first PhD students in 2019.

The partners have also jointly formed the OsloMet Artificial Intelligence Lab (OsloMet AI Lab). The lab focuses on a multidisciplinary approach and the development of artificial intelligence for people and society. OsloMet AI Lab manages research and students' projects in artificial intelligence, both applied and basic research, including theory and the use of machine learning in various applications. The activities involve students and researchers from both OsloMet and SimulaMet.

Since its inception, the partnership has led to a number of results. SimulaMet has employed a number of PhD students who've been admitted to the doctoral program at the Faculty of Technology, Art and Design (TKD) at OsloMet. In addition, PhD students admitted to PhD programs and employed by other organisations are supervised by researchers at SimulaMet. The staff at SimulaMet also develops and teaches courses at the university's PhD and Master's levels.

In December 2021, Vajira Thambawita defended his dissertation "DeepSynthBody: the beginning of the end for data deficiency in medicine" as the first PhD student to defend his thesis at SimulaMet, but also as the very first from the doctoral program in Engineering Science at OsloMet. Thambawita was supervised by Chief Research Scientist Michael A. Riegler, Professor / Chief Research Scientist Pål Halvorsen, and Professor Hugo Hammer.

"First of all, we are happy to see that Vajira's hard work over the last years results in the reward he truly deserves. At SimulaMet, we are proud to have played a part in his success. The other aspect of this is that his graduation marks an important milestone in the collaboration between Simula and OsloMet. Four years ago, these two organisations founded SimulaMet with the intention of creating and supporting a new PhD-program in Engineering Science at OsloMet. With Vajira's graduation, we start what we expect will be a string of PhD candidates coming out of this collaboration in the years to come", said Professor Olav Lysne when he was interviewed in connection with Thambawita's disputation.

Researchers at Simula Met and OsloMet have collaborated on numerous joint project applications, which has resulted in new externally funded projects that strengthen the collaboration.

Simula UiB

Simula UiB specialises in cybersecurity 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).

In 2021 Simula UiB researchers published 24 articles in journals, including "IEEE Transactions on Information Theory", and presented three articles at reputable conferences like Asiacrypt.

In total, Simula UiB has graduated 34 master's students and 7 PhD candidates. It is now three years since Simula UiB received funding for 12 recruitment positions from the Norwegian Ministry of Education and Research, and the first candidates are currently completing their studies.

As of 31 December 2021, a group of 27 people representing 13 different nationalities are employed at Simula UiB. In total, 38 people are formally affiliated with Simula UiB, including chief research scientists, researchers, postdoctoral fellows, PhD and master's students. About two-thirds belong to the Cryptography section, while the remaining belong to the Information Theory section. The researchers at Simula UiB supervised six postdoctoral fellows, eleven PhD students and eight master's students in 2021. All students affiliated with Simula UiB will receive their degrees from the University of Bergen.

The company in pandemic and change

Simula UiB has been impacted by the Covid-19 pandemic. Periods of home office and lockdown/re-opening affected our researchers. Therefore, a good corporate culture and a supportive working environment were a top priority in 2021. The company facilitated the opportunity for employees to meet whenever possible and focused on following up with PhD students in the final phase of their contracts.

In May 2021, Simula UiB's board of directors decided to engage a new director for the company, which resulted in some uncertainty among the employees. Following an extensive recruitment process that culminated in December of 2021, the board successfully recruited Professor Carlos Cid. Professor Cid brings a highly relevant set of background and experience to the role, both from his professorship in Information Security at the Royal Holloway University of London and from his adjunct position at Simula UiB that he has held since 2018.

Initiatives and external cooperation

Two researchers employed at Simula UiB were granted security clearance in 2021, one of whom has started in a 20% position with the National Security Authority (NSM). This supports Simula UiB's goal of educating candidates who can be awarded security clearance such that the existing collaboration with NSM continues to be strengthened.

In the spring of 2021, Simula UiB increased its investment in project applications to the Research Council of Norway and the EU. In November, researchers in the Cryptography section submitted an application for the Horizon Europe MSCA-program in collaboration with the Dutch Stichting Radboud University. In addition, preparations began for the Research Council's application deadline in February 2022, where researchers from the Cryptography and Information Theory section submitted two applications to the "Young Research Talents" and three to the "Researcher Project for Scientific Renewal".

The company also continued its focus on recruitment activities, including participating in Simula's summer internship program. The practice of offering internships works well as a recruitment channel for Norwegian PhD students, as two of the interns from 2021 were successfully recruited to PhD positions at Simula UiB.

Innovation

Simula Innovation

Simula Innovation (SI) has built a substantial portfolio of investments, consisting of spinout companies stemming from Simula's internal research and external tech start-up companies.

Since 2019, SI has experienced substantial growth in terms of both new investments and exits, in which SI has sold part or all of its shares in a company. In 2021, SI had three exits and invested in five new companies.

As of the 2021 year-end, SI's investment portfolio included 35 companies with combined revenue of over 400 million NOK and 410 employees. The 35 companies are grouped into the following eight categories: software, networks, salestech, proptech, fintech, medtech, media, and sport.

Simula Consulting

Simula Consulting's (SC) mission is to bridge the gap between academic discoveries and real-world challenges by providing high-quality consulting in deep tech. This is achieved through a strong collaboration between Simula Consulting's team and researchers from Simula Research Laboratory.

SC's primary focus has been developing tailored technological solutions and providing technology assessments for large and small companies like Equinor, Statkraft, PorterBuddy. SC has delivered on more than 15 projects, mainly in the machine learning and artificial intelligence domain.

In 2021, SC experienced significant growth, increasing its team from 2 to 8 people and increasing the annual revenues five times (from 3 million NOK to 15 million NOK). The goal for 2022 is to continue the growth while keeping quality and excellence at the highest level.

The Simula Garage

The Simula Garage (Norwegian: Gründergarasjen) is an incubator for technology-intensive start-up companies in the early stages, which gives selected companies free membership for 12 months. The incubator makes several valuable resources, expertise, networks and a community available to companies that would otherwise work alone from the kitchen counter or perhaps their own "garage". Since 2013, 691 members across 216 companies have gone through the incubator, and approximately one-third of Simula Innovation's investment portfolio consists of companies that first went through the Simula Garage.

The incubator forms an infrastructure for commercialisation for Simula and Oslo Metropolitan University (OsloMet) and works actively to help create new companies from these organisations. In addition, the Garage is catalysing innovation through several initiatives. Since 2018, 154 IT students at OsloMet have been matched with start-up companies in the Garage, and more than 50 hours of teaching, workshops and presentations aimed at students and researchers have been held. The Garage has also contributed to developing innovation subjects and a new Master's degree in Entrepreneurship at OsloMet.

While the Garage primarily supports companies that have already been founded, "Gründergarasjen Bootcamp" was developed in 2021 to train future entrepreneurs from academia. In this 12-week program, students and researchers work in teams to develop their commercialisation project, with weekly topical workshops and guest speakers and a final presentation of their business concepts to investors at "Demo Day". The Bootcamp provides real-world practice for founding solid start-up companies in the future, and this first pilot version will be completed in the early part of 2022 with participants from Simula, SimulaMet and OsloMet.

From left: Amalie Tveit Pedersen (SI), Ottar Hovind (SI) og Valeriya Naumova (SC).

Doctorates and Master's degrees 2021

Doctorates

Student	Title of thesis	Supervisor	Co-supervisor(s)	Institution
Vajira Thambawita	DeepSynthBody: the beginning of the end for datadeficiency in medicine	Michael A. Riegler	Pål Halvorsen, Hugo Hammer	Oslo Metropolitan University - Dept. of Computer Science
Jonas van der Brink	Computing Microscopic Structure-Function Relationships in Contraction of the Heart	Andrew G. Edwards	William E. Louch, Aslak Tveito, Glenn Terje Lines, Andrew D. McCulloch	University of Oslo - Dept. of Informatics
Saeed Shafiee Sabet	Understanding and Mitigating the Influence of Delay on Cloud Gaming Quality of Experience	Pål Halvorsen	Carsten Griwodz, Sebastian Möller	Technische Universität Berlin - Faculty for Electrical Engineering and Computer Science, Berlin (Germany)
Solveig Næss	Biophysical modeling of electric and magnetic brain signals	Gaute Einevoll	Torbjørn V. Ness, Marianne Fyhn, Anders M. Dale	University of Oslo - Dept. of Informatics
John Petter Indrøy	Selected Topics in Cryptanalysis of Symmetric Ciphers	Håvard Raddum	Carlos Cid, Øyvind Ytrehus	University of Bergen - Dept. of Informatics
Carl Martin Rosenberg	Supporting Continuous Engineering with Unsupervised Log Analysis	Leon Moonen	Are Magnus Bruaset	University of Oslo - Dept. of Informatics
Morten Øygarden	Algebraic Cryptanalysis of Cryptographic Schemes with Extension Field Structure	Øyvind Yrehus	Håvard Raddum	University of Bergen - Dept. of Informatics
Tristan Stöber	Cooperate to compete—Identifying a potential role for hippocampal region CA2 in episodic memory formation	Marianne Fyhn	Arvind Kumar, Trygve Solstad, Jill Leutgeb	University of Oslo - Dept. of Informatics
Ada Johanne Ellingsrud	Computational modelling of electrodiffusion and osmosis in cerebral tissue	Marie Elisabeth Rognes	Gaute Einevoll, Klas Pettersen, Kent-Andre Mardal	University of Oslo - Dept. of Mathematics
Ilsbeth G M van Herck	Biophysical and pharmacological properties of small conductance calcium-activated potassium channels	Aslak Tveito	Andrew G. Edvards, Mary Maleckar, Jussi Koivumäki, Hermenegild Arevalo	University of Oslo - Dept. of Informatics
Tao Ma	Executable Model Based Testing for Self-Healing Cyber-Physical Systems Under Uncertainty	Tao Yue	Shaukat Ali	University of Oslo - Dept. of Informatics
Karl Erik Holter	Robust preconditioning of multiphysics problems and interstitial fluid flow	Kent-Andre Mardal	Anders M. Dale, Unn Kristin H. Haukvik	University of Oslo - Dept. of Informatics
Safdar Aqeel Safdar	Improving Post-Deployment Configuration of Cyber-Physical Systems Using Machine Learning and Multi-Objective Search	Tao Yue	Shaukat Ali	University of Oslo - Dept. of Informatics
Konstantinos Kousias	Characterization and ML-based Modeling of Mobile Broadband Networks	Özgü Alay	Antonios Argyriou, Carsten Griwodz	University of Oslo - Dept. of Informatics
James D. Trotter	High-performance finite element computations: Performance modelling, optimisation, GPU acceleration & automated code generation	Xing Cai	Johannes Langguth, Simon Funke	University of Oslo - Dept. of Informatics

Master's degrees

Student	Title of thesis	Supervisor	Co-supervisor(s)	Institution
Abinaya Abbi Sakthivel	Coupled mixed finite elements applied to cardiac electrophysiology	Joakim Sundnes	Cécile Daversin-Catty	University of Oslo - Dept. of Informatics
Aigars Tumanis	Graph Clustering for Long Term Twitter Observations: Community Detection in Incremental Graphs	Johannes Langguth	Xing Cai, Konstantin Pogorelov	University of Oslo - Dept. of Informatics
Aleksander Kjelstrup	Revealing Dangerous Behaviors in Self-Driving Vehicles Due to Switching between Different Scenarios: A Search-based Approach	Shaukat Ali	Sabita Maharjan	University of Oslo - Dept. of Informatics
Andreas Huber	Observing Reddit's Interaction Network - A stream-based approach for large scale Network Analysis on Reddit	Johannes Langguth	Daniel Thilo Schröder	University of Oslo - Dept. of Informatics
Bernhard Hjelen	A meta-analysis on the effectiveness of digital contact tracing solutions to date	Øyvind Ytrehus		University of Bergen - Dept. of Informatics
Bernhard Nornes Lotsberg	LSTM Models Applied on Hydrological Time Series	Simon Funke	Felix Matt	University of Oslo - Dept. of Physics
Chinwendu Onwudiwe	Assessing Instability caused by Multiple Parameters of Automotive Multi-product Lines with Search Algorithms	Shaukat Ali	Paolo Arcaini	University of Tromsø - Dept. of Industrial Engineering
Christopher Hærem	Neural Networks for Lossy Weakly-Private Information Retrieval	Hsuan-Yin Lin	Eirik Rosnes	University of Bergen - Dept. of Informatics
Daniel Asefaw Woldegiorgis	Mimicking Facial Expressions from Actor to Virtual Avatar uning Machine Learing	Michael Riegler	Pål Halvorsen	University of Oslo - Dept. of Informatics
Eina Bergem Jørgensen	Benchmarking and Optimization of Cardiac Electrophysiology Solvers	Joakim Sundnes	Hermenegild Arevalo, Cécile Daversin-Catty	University of Oslo - Dept. of Physics
Erik Johannes Bjørnson Løvenskiold Grüner Husom	Deep learning to estimate power output from breathing	Sagar Sen	Pierre Bernabé, Morten Hjorth-Jensen	University of Oslo - Dept. of Physics
Ernest Pranoto	Soccer Highlight Website Design: Improving Current Interface and Proposing Universal Design and Accessibility Principles	Michael Riegler	Pål Halvorsen	Oslo Metropolitan University - Dept. of Computer Science
Han Wang	Coding for DNA-Based Storage	Eirik Rosnes	Alexandre Graell i Amat	Chalmers University of Technology - Dept.of Electrical Engineering, Gothenburg (Sweden)
Haris Kadragic	Machine learning-based approach for automated clipping of soccer events	Pål Halvorsen	Michael Riegler	University of Oslo - Dept. of Informatics
Henrik Hexeberg	Exploring MultiPath TCP Through Discrete Event Simulation	Øyvind Ytrehus		University of Bergen - Dept. of Informatics
Joakim Valand	Machine Learning-based approach for automated clipping of soccer events	Pål Halvorsen	Michael Riegler	University of Oslo - Dept. of Informatics
Jonas Wagle	Utilizing the SHAP framework to bypass intrusion detection systems	Øyvind Ytrehus		University of Bergen - Dept. of Informatics
Luk Bjarne Burchard	Accelerating Breadth-First Graph Traversals using Manycore Graphcore IPUs	Johannes Langguth	Daniel Schröder	Technische Universität Berlin - Dept. of Telecommunication System, Berlin (Germany)

Student	Title of thesis	Supervisor	Co-supervisor(s)	Institution
Markus Stige	Evaluation of multi-modal approaches for automatic spotting and classification of events in soccer games	Pål Halvorsen	Michael Riegler, Steven Hicks	University of Oslo - Dept. of Informatics
Matrika Subedi	Automated reporting system using deep convolutionl neural network in the medical domain	Pål Halvorsen	Michael Riegler, Steven Hicks	Oslo Metropolitan University - Dept. of Computer Science
Matthias Boeker	Classification of Schizophrenia based on Activity Time Series using Hidden Markow Models	Michael Riegler	Pål Halvorsen, Hugo Hammer	Karlsruhe Institute of Technology - Dept. of Economics and Management, Karlsruhe (Germany)
Nora Elisabeth Qi Eck Pålsrud	Exploring Neural Machine Translation Architectures for Automated Code Repair	Leon Moonen	Laszlo Erdodi	University of Oslo - Dept. of Informatics
Rabindra Khadka	Meta-Learning for Medical Image Segmentation	Steven Hicks	Vajira Thambawita, Michael Riegler, Pål Halvorsen	University of Trieste - Dept. of Engineering and Architecture, Trieste (Italy)
Samuel Berntzen	Optimal Allocation of EV Charging Stations: A case study of the Norwegian road network	Johannes Langguth	Konstantin Pogorelov	BI Norwegian Business School - Dept. of Accounting and Operations Managment
Sigurd Jordal	Success-rate Estimation for Side Channel Analysis	Martijn Stam	Kristian Gjøsteen	NTNU - Dept. of Mathematical Sciences
Simen Håpnes	Solving Partial Differential Equations by the Finite Difference Method on a Specialized Processor	Xing Cai	Are Magnus Bruaset, Morten Hjorth-Jensen	University of Oslo - Dept. of Physics
Simen Mailund Svendsen	In Search of Lost Time: A Deep Dive in Overlapping Computation and Communication in Memory Bound MPI Applications	Xing Cai		University of Oslo - Dept. of Informatics
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Characterization and ML-based Modeling of Mobile Broadband Networks, Konstantinos Kousias, University of Oslo.

Improving Post-Deployment Configuration of Cyber- Physical Systems Using Machine Learning and Multi- Objective Search, Safdar Aqeel Safdar, University of Oslo.

High-performance finite element computations: Performance modelling, optimisation, GPU acceleration & automated code generation, James D. Trotter, University of Oslo.

Robust preconditioning of multiphysics problems and interstitial fluid flow, Karl Erik Holter, University of Oslo.

Executable Model Based Testing for Self-Healing Cyber-Physical Systems Under Uncertainty, Tao Ma, University of Oslo.

Biophysical and pharmacological properties of small conductance calcium-activated potassium channels, Ilsbeth Gerarda Ma van Herck, University of Oslo.

Algebraic Cryptanalysis of Cryptographic Schemes with Extension Field Structure, Morten Øygarden, University of Bergen.

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Supporting Continuous Engineering with Unsupervised Log Analysis, Carl Martin Rosenberg, University of Oslo.

Selected Topics in Cryptanalysis of Symmetric Ciphers, John Petter Indrøy, University of Bergen.

Computing Microscopic Structure-Function Relationships in Contraction of the Heart, Jonas van den Brink, University of Oslo.

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Brain modelling: from magnetic resonance images to finite element simulation – a lecture series, Marie E. Rognes, Porous Media Math Seminar Series, University of Bergen, Norway.

Computational brainphatics, Marie E. Rognes, 2021 SIAM Conference on Computational Science and Engineering.

Code-Based Testing with Constraints, Arnaud Gotlieb, HUAWEI Paris – 31 March 2021, HUAWEI Paris, France.

Numerical foundations of the brain's waterscape, Marie E. Rognes, Séminaire du Laboratoire Jacques-Louis Lions (invited), Sorbonne University, Paris, France.

Depressed brain cells – a numerical perspective, Marie E. Rognes, 6th Oxford International Neuron and Brain Mechanics Workshop, Oxford, UK.

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Breaking silos in data innovation in Europe: Experiences of AI4EU, EUH4D, and DIH4AI, Arnaud Gotlieb, Data Week 2021.

Understanding the mechanisms of the brain's waterscape, Marie E. Rognes, 2021 InterPore Conference (online).

From Data Mining using Tensor Factorizations to Multimodal Data Mining using Coupled Matrix/Tensor Factorizations, Evrim Acar Ataman, Nordic Probabilistic AI School (virtual).

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Microservices for Continuous Deployment, Monitoring and Validation in Cyber-Physical Systems: an Industrial Case Study for Elevators Systems, Aitor Arrieta, ICSA Software Architecture in Practice (SAIP), IEEE.

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Posters

Encoding Temporal and Spatial Vessel Context using Self-Supervised Learning Model (Student Abstract), Pierre Bernabé, Helge Spieker, Arnaud Gotlieb, Bruno Legeard, AAAI Conference on Artificial Intelligence (AAAI-21), Student Abstract and Poster Program.

Automated Code Generation for GPU-Based Finite Element Computations in FEniCS, James D. Trotter, Johannes Langguth, Xing Cai, SIAM Conference on Computational Science and Engineering (CSE21), SIAM.

An Optimization Framework for Regularized Linearly Coupled Matrix-Tensor Factorization, Carla Schenker, Jeremy E. Cohen, Evrim Acar Ataman, 2020 28th European Signal Processing Conference (EUSIPCO), Amsterdam, Netherlands.

Anomaly Detection in Optical Links Using State of Polarization Monitoring, Steinar Bjørnstad, Aamir Gulistan, 2021 Joint European Conference on Networks and Communications & 6G Summit, Porto, Portugal.

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Understanding the Dynamics of Complex Systems through Time-Evolving Data Mining, Marie Roald, SIAM International Conference on Data Mining.

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Paneldeltager i Abels tårn, Marte J. Sætra, NRK P2.

Marte Julie (28) forsøker å løse et av verdens største mysterier, Marte J. Sætra, NRK P3.

Hvor mye veier jorda?, Marte J. Sætra, Titan.uio.no.

Et brutalt urovekkende cyberangrep. Nå haster det!, Olav Lysne, Aftenposten.

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Ghost in the Machine: Hvem lytter på hemmelighetene våre i datanettverkene, Olav Lysne, Simula/Arendalsuka.

The Threat Landscape of Critical Infrastructure and ICS Security Challenges, Olav Lysne, Andrew Bochman, Tomomi Aoyama, 2050. 10000 Days to Transform, Ignite Talks.

Marte Julie Sætra er forsker i hjernefysikk, Marte J. Sætra, vol. 1, pp. 26 – 27, Min hjernehelse, 1, Hjernerådet.

5G og sikkerhet, Olav Lysne, Nyhetsmorgen, NRK P2.

Dataanalyser som redder verden – science not fiction, Marte J. Sætra, Kulturhuset og online, Hvordan utforske hjernen med fysikk og datasimuleringer?, Centre for Digial Life Norway.

Digital kompetanse på alles lepper, Marianne Aasen, Arendalsuka

Kunstig Intelligens - Kan vi stole på den svarte boksen?, Inga Strümke, Michael Riegler, Arendalsuka

Misc

Digital Value Chains – Debate, Olav Lysne, Cyber Foresight Workshop, German Council on Foreign Relations.

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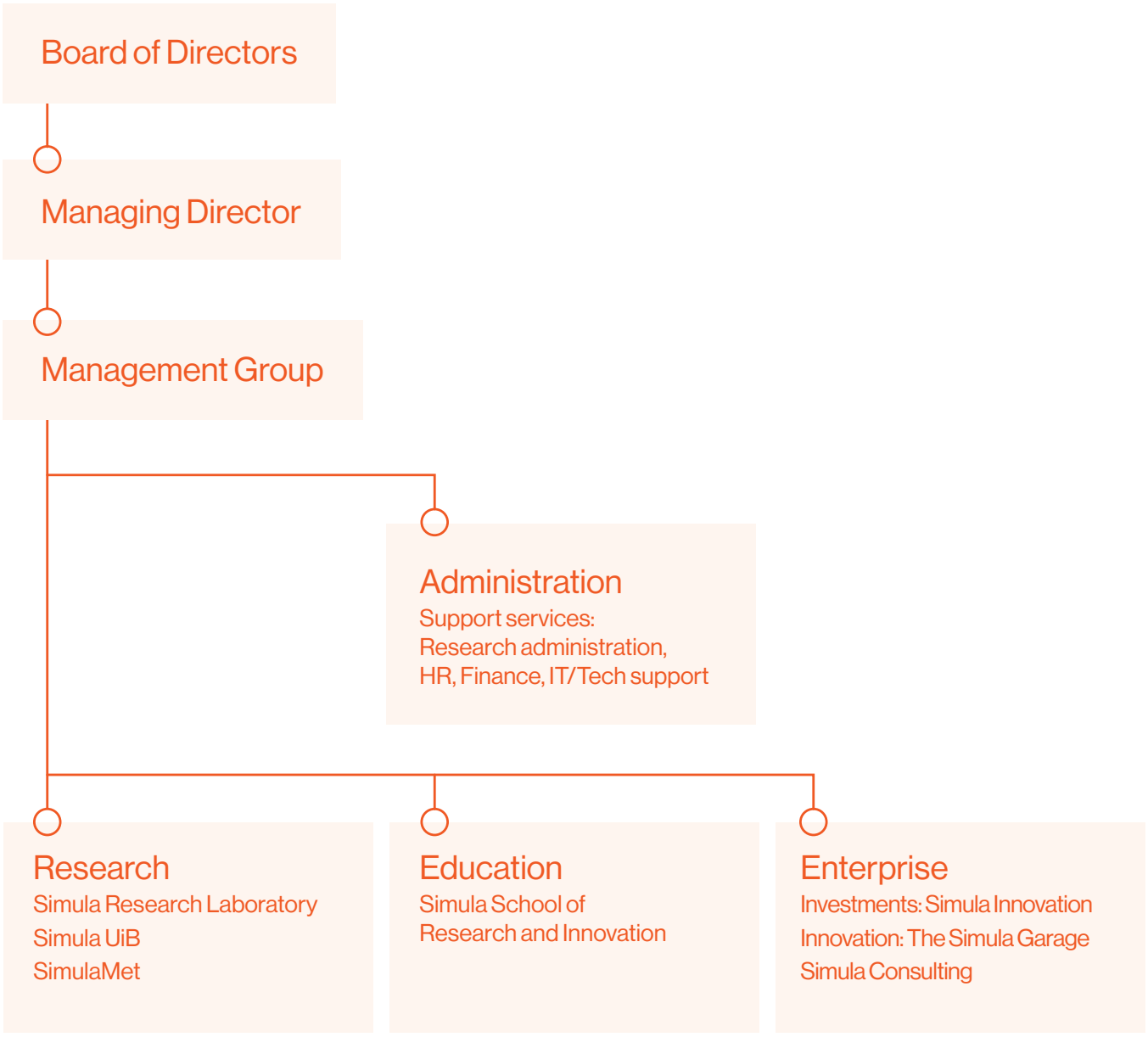
Organisational structure



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