MSc Advanced Computational Science Orientation 2023

Skoltech

Prof. Vladimir Palyulin

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Academic Calendar 2023 / 2024

Skoltech

Ultimate guide to graduate Skoltech in 8 terms

Term 1A
– Innovation Workshop

Term 1B
– Courses

Term 2
– Courses

Term 3
– Courses
– *Early* Research Project

Term 4
– Courses
– *Early* Research Project

Winter Term (3 weeks)
– Individual Study Period

Summer Term (8 weeks)
– Industrial Immersion

Term 5
– Courses
– Research Project

Term 6
– Research Project!
– Courses

Term 7
– Research Project!!
– *(Courses)*

Term 8
– Research Project!!!
– Thesis Defense

2023-2024 MSc-1 Academic Calendar

MSc Advanced Computational Science Orientation 2023

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Aug-23

	M	Tu	W	Th	F	Sa	Su
		1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	31			

August

Orientation course

31 Aug - Orientation Q&A session

Sep-23

		M	Tu	W	Th	F	Sa	Su
						1	2	3
Week 1	IW	4	5	6	7	8	9	10
Week 2	IW	11	12	13	14	15	16	17
Week 3	IW	18	19	20	21	22	23	24
Week 4	IW	25	26	27	28	29	30	

Term 1A (IW): 04 - 29 September

01 Sep - IW Opening Ceremony

Week of 18 Sep: Registration for Term 1B

Oct-23

		M	Tu	W	Th	F	Sa	Su
								1
Week 1	C	2	3	4	5	6	7	8
Week 2	C	9	10	11	12	13	14	15
Week 3	C	16	17	18	19	20	21	22
Week 4	E	23	24	25	26	27	28	29
		30	31					

Term 1B: 02 - 27 October

Drop/Add period for Term 1B: 02 - 08 Oct

Week of 09 Oct: Registration for Term 2

18 Oct: Industry Day

Nov-23

		M	Tu	W	Th	F	Sa	Su
Week 1	C			1	2	3	4	5
Week 2	C	6	7	8	9	10	11	12
Week 3	C	13	14	15	16	17	18	19
Week 4	C	20	21	22	23	24	25	26
Week 5	C	27	28	29	30			

Term 2: 30 October - 22 December

Drop/Add period for Term 2: 30 Oct - 05 Nov

Public Holiday: 06 Nov

Dec-23

		M	Tu	W	Th	F	Sa	Su
						1	2	3
Week 6	C	4	5	6	7	8	9	10
Week 7	E	11	12	13	14	15	16	17
Week 8	E	18	19	20	21	22	23	24
	VAC	25	26	27	28	29	30	31

Term 2: 30 October - 22 December

Week of 18 Dec: Registration for Winter Term

IW	Innovation Workshop
C	Credit-bearing activity (course, research)
E	Evaluation period (assessment and application period)
ISP	Independent Studies Period
IND	Industrial Immersion
VAC	Vacation

! Kindly note: the academic week is officially 6 days long, according to p.3.9 of Policy on Graduate Educational Programs.

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Jan-24

		M	Tu	W	Th	F	Sa	Su
	VAC	1	2	3	4	5	6	7
Week 1	ISP	8	9	10	11	12	13	14
Week 2	ISP	15	16	17	18	19	20	21
Week 3	ISP	22	23	24	25	26	27	28
Week 1	C	29	30	31				

Winter Term: 08 - 26 January

Independent Studies Perios (ISP)

Week of 15 Jan: Registration for Term 3

Mid-Jan: DEADLINE to name MS research advisor

Drop/Add period for Term 3: 29 Jan - 04 Feb

Feb-24

		M	Tu	W	Th	F	Sa	Su
					1	2	3	4
Week 2	C	5	6	7	8	9	10	11
Week 3	C	12	13	14	15	16	17	18
Week 4	C	19	20	21	22	23	24	25
Week 5	C	26	27	28	29			

Term 3: 29 January - 22 March

Drop/Add period for Term 3: 29 Jan - 04 Feb

Feb - March: collection of Industrial Immersion projects from companies and self-initiated by students

Public Holidays: 23 Feb

Mar-24

		M	Tu	W	Th	F	Sa	Su
						1	2	3
Week 6	C	4	5	6	7	8	9	10
Week 7	E	11	12	13	14	15	16	17
Week 8	E	18	19	20	21	22	23	24
Week 1	C	25	26	27	28	29	30	31

Term 3: 29 January - 22 March

Week of 04 March: Registration for Term 4

Public Holidays: 08 March

End of March: Deadline for a self-initiated projects and companies proposals

Drop/Add period for Term 4: 25 - 31 March

Apr-24

		M	Tu	W	Th	F	Sa	Su
Week 2	C	1	2	3	4	5	6	7
Week 3	C	8	9	10	11	12	13	14
Week 4	C	15	16	17	18	19	20	21
Week 5	C	22	23	24	25	26	27	28
	VAC	29	30					

Term 4: 25 March - 31 May

April - Mid-May: Students are intreviewd by companies and assigned to Industrial Immersion projects

The spring break dates: 29 April - 12 May

May-24

		M	Tu	W	Th	F	Sa	Su
	VAC			1	2	3	4	5
	VAC	6	7	8	9	10	11	12
Week 6	C	13	14	15	16	17	18	19
Week 7	E	20	21	22	23	24	25	26
Week 8	E	27	28	29	30	31		

Term 4: 25 March - 31 May

The spring break dates: 29 April - 12 May

Week of 13 May: Registration for Summer Term

Jun-24

		M	Tu	W	Th	F	Sa	Su
							1	2
Week 1	IND	3	4	5	6	7	8	9
Week 2	IND	10	11	12	13	14	15	16
Week 3	IND	17	18	19	20	21	22	23
Week 4	IND	24	25	26	27	28	29	30

Summer Term: 03 June - 26 July

Industrial Immersion

Public Holiday: 12 June

Jul-24

		M	Tu	W	Th	F	Sa	Su
Week 5	IND	1	2	3	4	5	6	7
Week 6	IND	8	9	10	11	12	13	14
Week 7	IND	15	16	17	18	19	20	21
Week 8	IND	22	23	24	25	26	27	28
	VAC	29	30	31				

Summer Term: 03 June - 26 July

Industrial Immersion

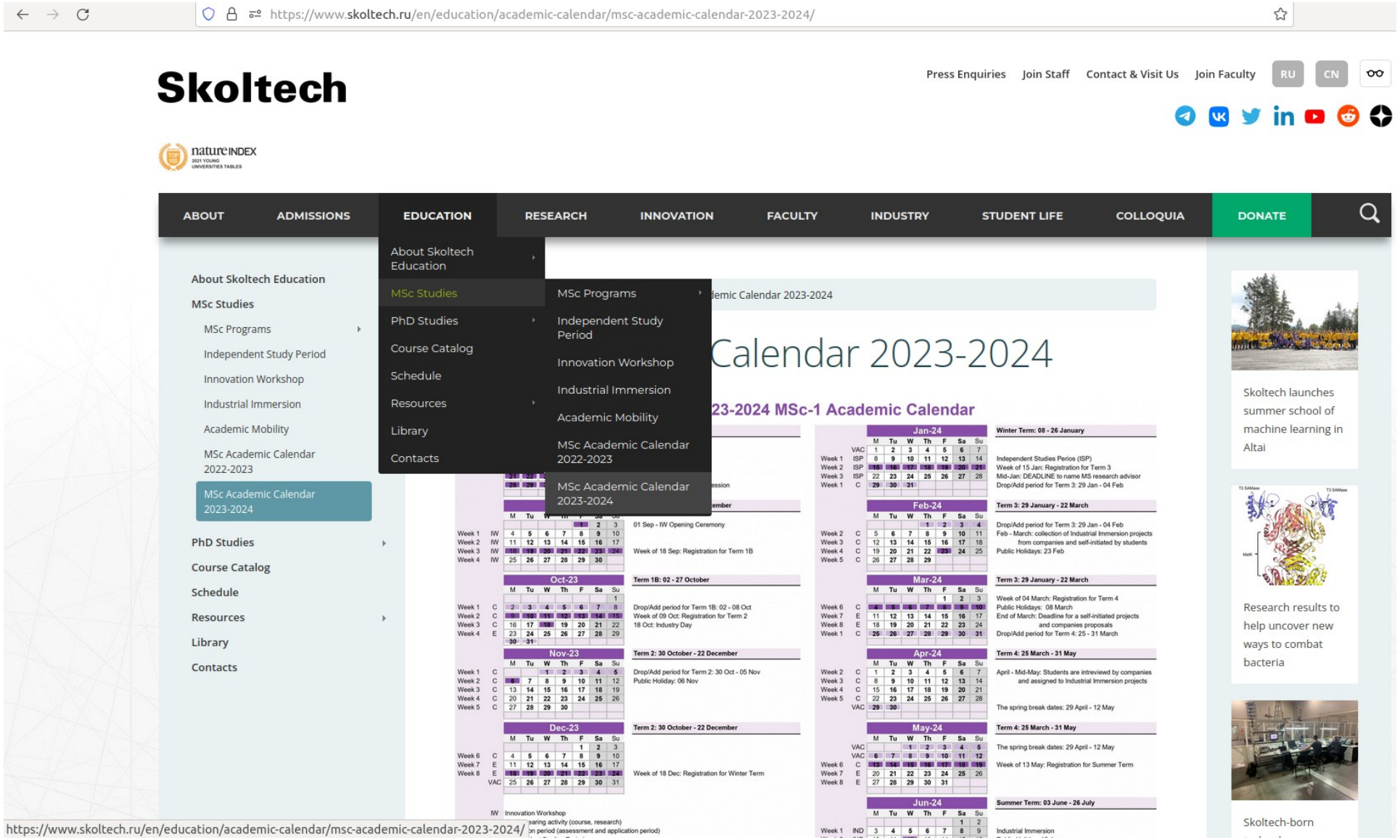
Aug-24

	M	Tu	W	Th	F	Sa	Su
VAC				1	2	3	4
VAC	5	6	7	8	9	10	11
VAC	12	13	14	15	16	17	18
VAC	19	20	21	22	23	24	25
	26	27	28	29	30	31	

Vacation: 29 July - 30 August

Late Aug: Registration for Term 5 for MSc-2

How to find MSc Academic Calendar 2023/2024



https://www.skoltech.ru/en/education/academic-calendar/msc-academic-calendar-2023-2024/

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Major dates for 1st year MSc students

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Major dates for 1st year MSc students

T1A

Term 1A

- Innovation Workshop

T1B

Term 1B

- Start of research advisor selection **End of Oct**

T2

Term 2

- Research projects Pitch Fair: **Mid-Nov**
- End of research advisor selection **Mid-Dec**

Registration to courses

OPENS 3 weeks before

CLOSES 2 weeks before

the next term starts

Drop/add period

opens ONLY for the 1st week

of the ongoing term

Major dates for 1st year MSc students

WT

Winter Term

- Individual Study Period
  3 **weeks**
- Start of research project
  Mid-Jan

T3

Term 3

- Registration for Industrial Immersion:
  Mar – Apr

T4

Term 4

- Industrial Immersion projects finalised:
  Mid-May

ST

Summer Term

- Industrial Immersion!
  8 weeks

Major dates for 2nd year MSc students

Industry Day

- Dates:
  Early Oct 2023
- **Early Oct 2024**

MSc Thesis Status Review (TSR)

- Thesis pre-pre-defense
- Dates:
  Late Jan

MSc Thesis Pre-defense

- Dates:
  End-of-April - Mid-May

MSc Thesis Defense

- Dates:
  Beginning - Mid-June

SAVE THE DATES!!!

Put them in the calendar

Set auto-reminders

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Curriculum structure

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Curriculum streams in Skoltech https://www.skoltech.ru/en/education/msc-programs/msc-programs/

S1

"Science, Technology and Engineering (STE)"

a.k.a. Coursework

36 ECTS credits

S2

"Sector"

a.k.a. Industrial Immersion

12 ECTS credits

S3

"Innovation and Entrepreneurship"

a.k.a. E&I

12 ECTS credits

S4

"Research and MSc Thesis Project"

a.k.a. Research

36 ECTS credits

S5

"Options"

a.k.a. Optional elective courses

24 ECTS credits

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"Extracurricular"

a.k.a. English toolkit, Academic/thesis writing

Max 10 ECTS credits/year

ECTS = European Credit Transfer and Accumulation System, 1 ECTS = 27 hours of workload

Educational Program "Advanced Computational Science"

Nikolay Brilliantov

Professor

Applied AI Centre

ACS MSc program director

Vladimir Palyulin

Associate Professor
CAIT

ACS MSc program coordinator

Sergey Rykovanov

Associate Professor

CAIT

MSc Advanced Computational Science curriculum (STE)

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Skolkovo Institute of Science and Technology

Автономная некоммерческая образовательная организация высшего образования
"Сколковский институт науки и технологий"
Autonomous Non-Profit Organization for Higher Education
"Skolkovo Institute of Science and Technology"

УТВЕРЖДАЮ / APPROVED BY
Ректор / President
_____ А.П. Кулешов / Alexander Kuleshov

«___» _____ 2023 г.

Учебный план подготовки магистров / Master program curriculum						1 год / Year 1						2 год / Year 2				
по образовательной программе "Современные вычислительные методы", по направлению 02.04.01 Математика и компьютерные науки / Educational Program "Advanced Computational Science", Field of Science and Technology 02.04.01 Mathematics and Computer Science						Семестр / Term						Семестр / Term				
форма обучения – очная, срок обучения – 2 года, год приема – 2023 / full-time, onsite form of study, study period - 2 years, year of admission – 2023						Осень / Fall		Зимний семестр / Winter Term	Весна / Spring		Летний семестр / Summer Term	Осень / Fall		Зимний семестр / Winter Term	Весна / Spring	
#	Код	Пререквизиты	Наименование курса на русском языке	Наименование курса на английском языке	з.е.	1	2		3	4		5	6		7	8
#	Code	Prerequizites	Course Title in Russian	Course Title in English	ECTS credits	1	2		3	4		5	6		7	8
Модуль 1. "Наука, техника и технологии" (36 з.е.) Stream 1. "Science, Technology and Engineering (STE)" (36 ECTS credits)																
Обязательная часть - 18 з.е. / Compulsory Part - 18 ECTS credits																
1	MA060113		Научные вычисления	Scientific Computing	6	6										
2	MA060024		Вычислительная линейная алгебра	Numerical Linear Algebra	6		6									
3	MA060018		Машинное обучение	Machine Learning	6				6							
Часть, формируемая участниками образовательных отношений - 18 з.е. / Elective Part - 18 ECTS credits																
4	MA030111		Введение в анализ данных	Introduction to Data Science	3	3						X				
5	MA030406		Основы программной инженерии	Foundations of Software Engineering	3	3						X				
6	MA030555		Введение в обработку естественного языка	Introduction to Natural Language Processing	3		3						X			
7	MA030367		Лабораторный курс "Высокопроизводительный Python"	High Performance Python Lab	3		3						X			
8	MA030327		Теоретические методы глубокого обучения	Theoretical Methods of Deep Learning	3		3						X			
9	MA030632		Методы оптимизации в машинном обучении	Optimization Methods in Machine Learning	3		3						X			
10	MA060326		Основы многомасштабного моделирования: Кинетика	Foundations of Multiscale Modeling: Kinetics	6				6						X	
11	MA060005		Численное моделирование	Numerical Modeling	6				6						X	
12	MA060287		Высокопроизводительные вычисления и современные вычислительные архитектуры	High Performance Computing and Modern Architectures	6					6						
13	MA030518		Методы машинного обучения для инженерных задач	Machine Learning for Engineering Applications	3					3						
14	DA060057		Глубокое обучение	Deep Learning	6					6						
15	MA030556		Методы глубокого обучения для обработки естественного языка	Deep Learning for Natural Language Processing	3					3						
16	MA030470		Продвинутые методы численного решения уравнений в частных производных	Advanced Solvers for Numerical PDEs	3							X				
17	MA030576		Машинное обучение для физических наук	Machine Learning for Physical Sciences	3							X				
18	MA030504		Теория сетей	Network Science	3								X			
19	MA060573		Вычислительные методы в атомистическом моделировании	Computational Methods in Atomistic Simulations	6								6			

ACS Courses in: Term 1B (min 6 ECTS credits) & Term 2 (min 12 ECTS credits)

Course	ECTS	Instructor	Type	Term
Scientific computing	6	N. Koshev+D. Yarotsky	**Compulsory**	1B
Introduction to Data Science	3	M. Panov + M. Belyaev	Recommended	1B
Soft Condensed Matter	3	V. Palyulin (A. Vishnyakov)	Recommended	1B
Stochastic Methods in Mathematical Modelling	6	V. Palyulin	Recommended	2
Numerical Linear Algebra	6	I.V. Oseledets	**Compulsory**	2
High Performance Python Lab	3	S. Rykovanov	Recommended	2
Introduction to Linux and Supercomputers	3	I. Zacharov	Recommended	2

NB!

Min credits/term: 12

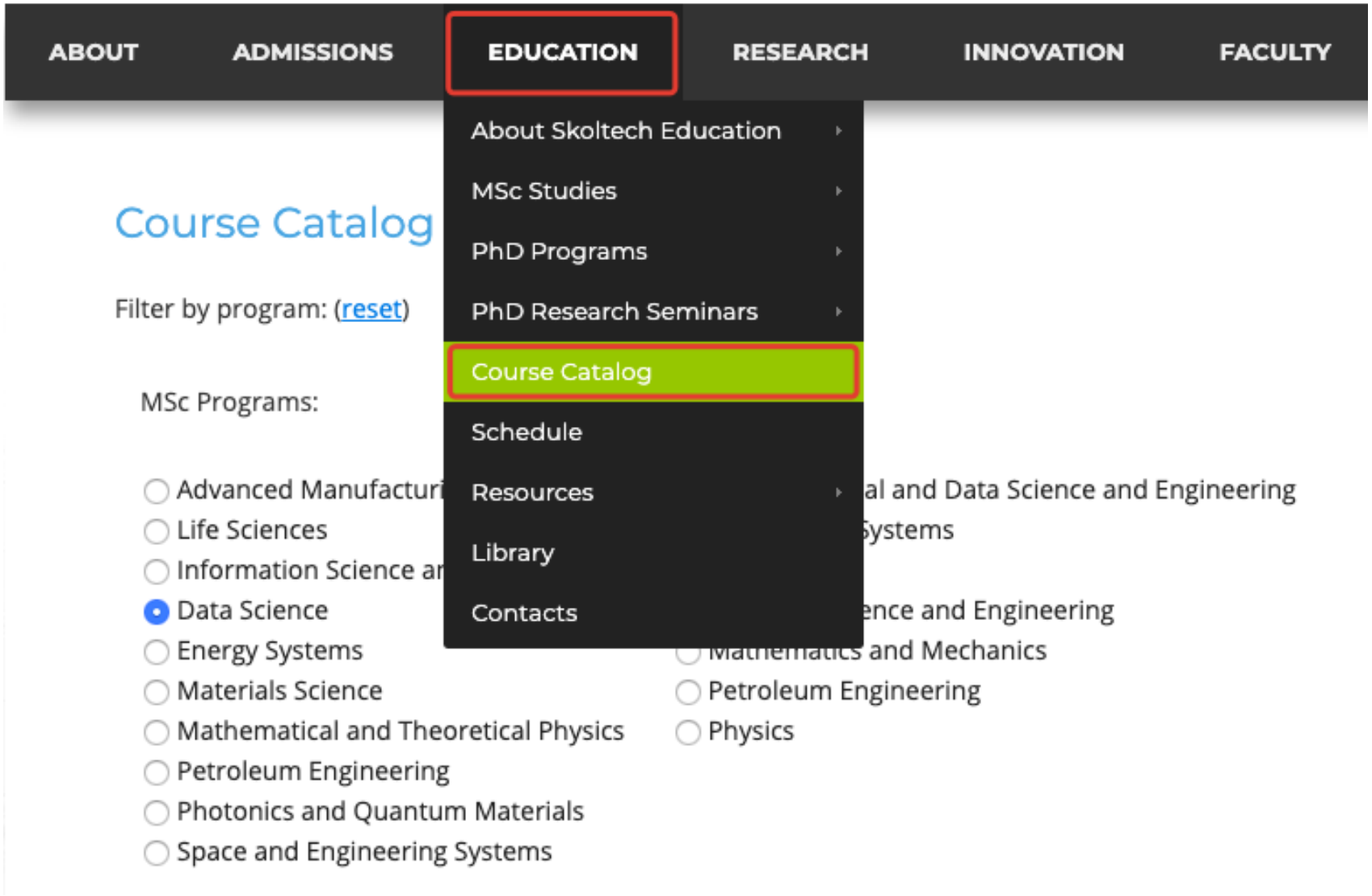
Max credits/term: 18

Min credits/year: 60

Max credits/year: 70

Total: 120..140

How to find Courses Catalogue



https://www.skoltech.ru/en/education/course-catalog/

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Research

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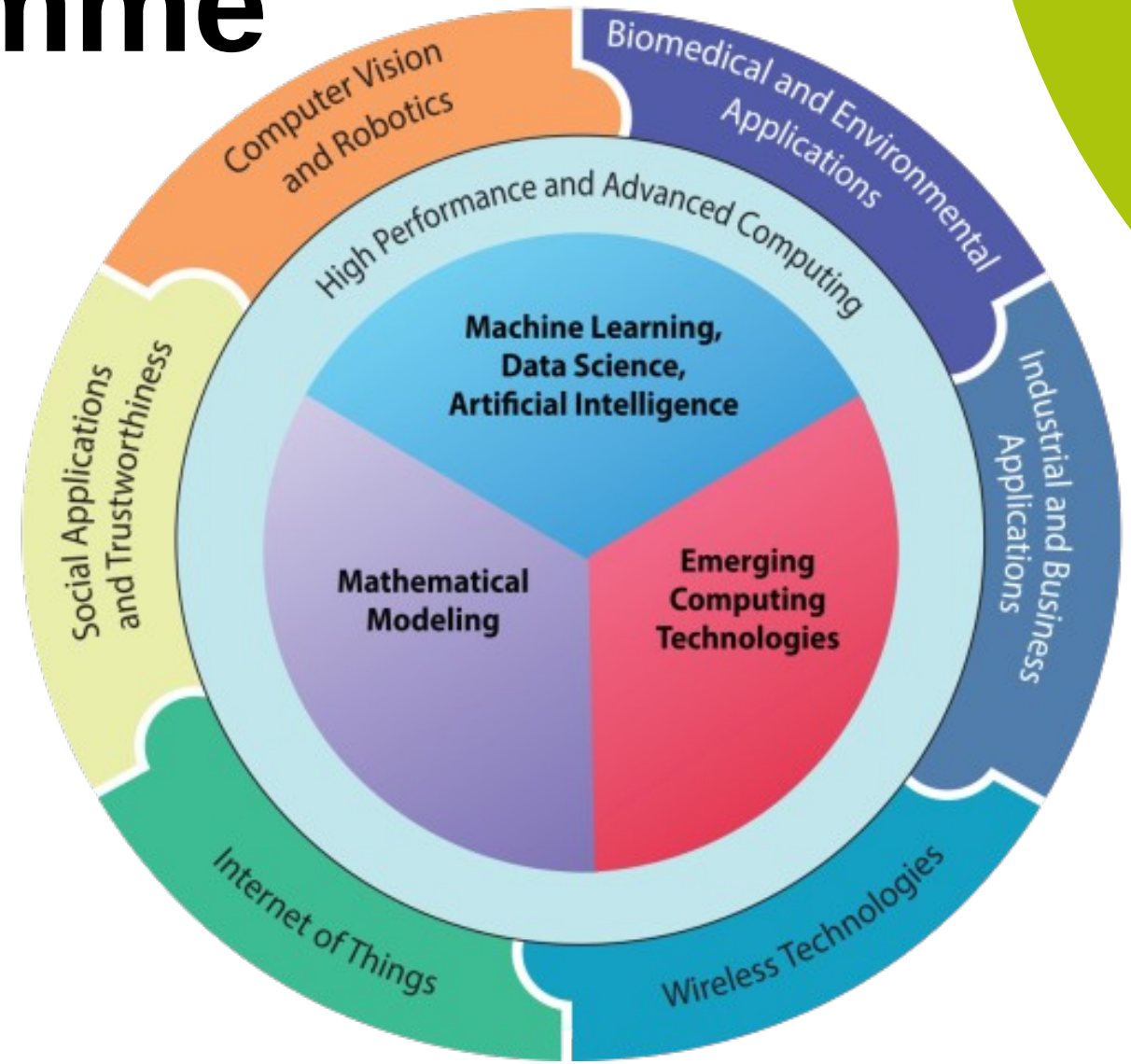
Research directions of the programme



ACS research groups

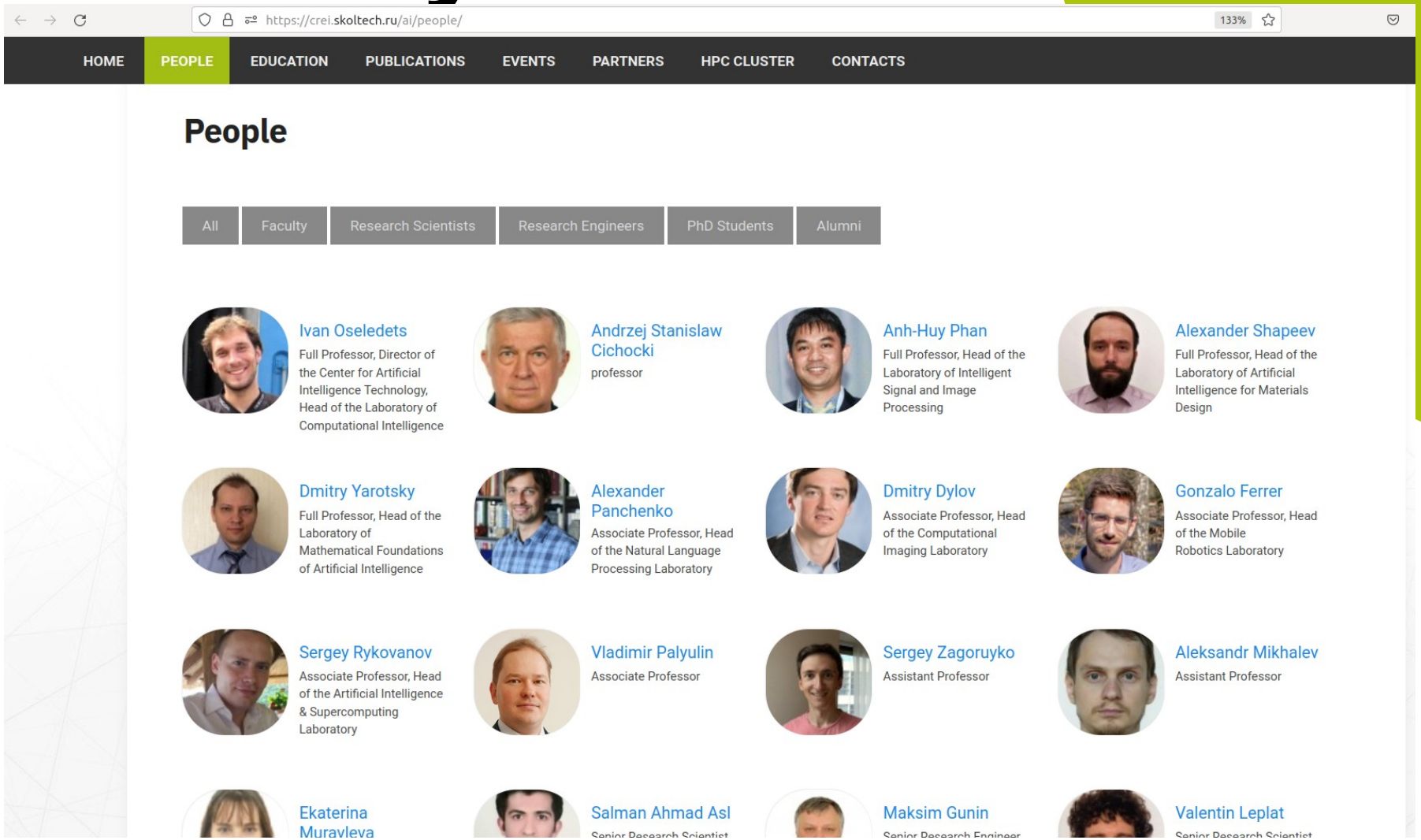
- Advanced Multiscale Modeling Laboratory
- Advanced Data Analytics in Science and Engineering (ADASE)
- Cognitive Computing Hardware (CONCORDE)
- Computational Molecular Science
- Computational Intelligence
- High-Performance Computing (HPC)
- iMolecule
- Machine Learning and Algorithms in Bioinformatics
- Mass Spectrometry Lab (MassSpecLab)
- Multidimensional Inverse and Ill-posed Problems (MIIP)
- Quantum algorithms for machine learning and optimisation
- Laboratory of Artificial Intelligence for Materials Design

- Nikolay Brilliantov
- Vladimir Palyulin
- Evgeny Burnaev
- Dmitry Yudin
- Evgeny Nikolaev
- Ivan Oseledets
- Sergey Rykovanov
- Natallia Strushkevich
- Petr Popov
- Yury Kostyukevich
- Nikolay Koshev
- Alexandr Shapeev

https://raic.skoltech.ru/#projects

https://crei.skoltech.ru/ai/homepage/labs/

Faculty & researchers



https://crei.skoltech.ru/ai/people/

HPC infrastructure

Skoltech HPC cluster “**Zhores**” – one of the most powerful supercomputers in Russia focused on Big Data computational tasks related to Machine Learning and Artificial Intelligence.

https://crei.skoltech.ru/ai/hpc/

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Contact details

Skoltech

If unsure, contact:

ACS education support team:
acs@skoltech.ru

Inquiries related to the MSc program and tracks:

- ACS curriculum
- Content support with registration for courses *(what course should I choose?)*
- Research
- Advising
- Thesis
- etc.

Education office:
Helpdesk -> Education support

Inquiries related to general education matters:

- Transcripts and student records
- Technical support with registration for courses *(can't register in SONIS)*
- Manual enrollment
- Credits transfer/counting
- Change of academic status (e.g. academic leave)
- Stipend
- etc.

ACS programme support

acs@skoltech.ru

Vladimir Palyulin

Associate Professor

ACS MSc program coordinator

Elena Bozhkevich

Senior Edu Specialist

DS ACS CDSE | CAIT

Maria Dronina

Education Specialist

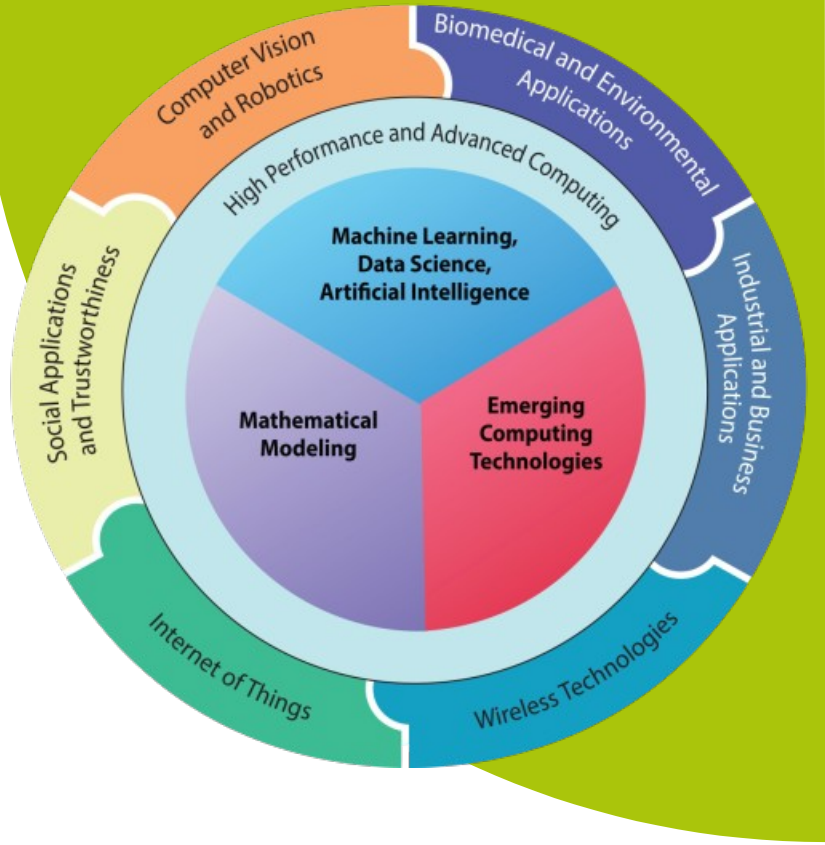
DS, ACS, CDSE

Skoltech AI websites:

https://raic.skoltech.ru/

https://crei.skoltech.ru/ai/

- Skoltech AI research groups
- Skoltech AI publications (faculty and PhD students)
- Skoltech AI industrial and academic partners
- HPC clusters



Questions?

thx.

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