MatRIC Centre for Research, Innovation and Coordination of Mathematics Teaching

Annual report 2022

Index

Introduction

MatRIC is now in its final year as a center for excellence in education. Several of MatRIC's activities have now been well-established at the University of Agder. In this report, we will highlight MatRICs student partnership and the work at our drop-in centers. We see that the drop-in centers have transformed the student's learning experience in mathematics. We also highlight the work in mathematics in the business administration program. The bridging course and student partnership have improved the students learning in mathematics. In 2022 MatRIC has implemented new assessment in mathematics for engineering students. This is a result of more than ten years of research testing and development.

MatRIC continues to do world-leading research in higher education mathematics education. MatRIC is present at major international conferences on higher education mathematics teaching, and MatRIC research is published in international journals.

MatRIC is a dynamic center which integrate actions and dissemination. All MatRICs actions have embedded dissemination. For example, drop-in Annual conference, Course for mathematics teacher educators and the Learning assistant program, which you will read about in this report, is both an action that also has a dissemination part. The actions that MatRIC do are all targeted towards MatRIC's vision:

Students enjoying transformed and improved learning experiences of mathematics in higher education.

As described in MatRIC's action plan this vision shall be addressed in three focus areas:

1. **Transforming students learning experiences,**
2. **Transforming mathematics teaching and**
3. **Research and development-based mathematics education.**

Transforming students learning experiences

The intention is that students enjoy mathematics and are motivated to engage with the challenges of mathematics. They should feel themselves supported throughout their studies without lowering the cognitive demand to the extent that it interferes with their learning. The intention is that all students feel fully engaged as active learners and partners in learning, teaching and assessment.

Students as partners

MatRIC two drop-in centers offers math support 20 hours per week at both Grimstad Campus and Kristiansand Campus. We clearly see that the drop-in center is both an action towards better learning experience in mathematics but is also a key point of dissemination to students at UiA. Skrivestua – a drop in for academic writing has also been established at UiA and is now co-located with MatRIC drop-in

New drop-in learning center

Do you need guidance on writing, help with maths or academic writing. The new learning center in the library on Campus Kristiansand opened in April.

"This is great. We are now located more centrally on campus, and it's easier for everyone to find us", say teacher students Martin Nordskog and Hallvard Arntzen Foss, who are both learning assistants at MatRIC drop-in

From April, the new learning centre is located on the ground floor of the library on Campus Kristiansand. UiA's resources and services for students and staff will now be located in one place.

MatRIC Drop-in is UiA's drop-in service offering mathematics support. It is staffed from 10:00 to 14:00 every weekday. They also use the new training rooms at the learning centre for workshops.

An arena for co-creation

MatRIC is happy about using the new facilities.

"The location is more central, there is more space, and we also have the opportunity to sit in more shielded spaces when required", Nordskog says.

The new learning centre is used for workshops, courses and lectures. There is also room for individual and group study spaces for students.

"We wanted to provide a space for students and staff to share experiences and knowledge with each other, and take advantage of the synergy that can arise when creating a shared physical and virtual learning space", says John Olav Glastad Bjørnestad, director at UiA PULS - Centre for Teaching and Learning and board member of MatRIC.

The learning centre is therefore not a quiet area, although consideration for others is encouraged.

This is what you will find at the learning centre:

- Skrivestua (UiA's Writing Centre)
- MatRIC drop-in
- Course room for UiA PULS activities
- Technical rehearsal room for students and teachers

Creating unity among mathematics students

Students in mathematics from various study programs are making use of campus for social and academic gatherings.

"There has been good attendance at all the sessions. The aim is to create better unity among maths students across courses and programs."

This is what Martin Nordskog says. He is a teaching assistant in mathematics while in his fifth year of teacher training in mathematics, physics and natural sciences at UiA.

Throughout the spring and autumn semesters in 2022, Nordskog and 7 other teaching assistants organized workshops, activity evenings and academic events.

In addition, several of the assistants run the drop-in offer, MatRIC, where students can get support with mathematics.

"After the pandemic, we noticed a need to gather in person. Much of the teaching is still online, and many students are alone and struggle with various mathematics topics. By working in groups, we can explore the topics together instead of individually," he says.

Activity evenings

Another initiative is activity evenings with focus on social interaction. That has been a great success. About 20 students have turned up every time.

Hallvard Foss is in his fourth year of teacher training in mathematics, science and sport and was responsible for the events last semester. The background for the initiative, among other things, are the results from last year's SHoT survey among students at UiA. There it emerged that many students feel lonely.

In 2022, 8 student mentors helped with the drop-in offer, academic evenings, activities and workshops. From the left: Marjan Daliri, Julie Kogstad, Elisabeth Træland, Birgitte Øverland, Martin Nordskog, Hallvard Foss og Oskar Solberg.

"We meet to interact, and many of us have the same interests. We organize quizzes and solve rebus puzzles. Students on all mathematics levels are welcome," Foss says.

Here the students get to know each other during the quiz rounds. But they also have the chance to eat together. A good meal is always served to everyone who comes. Many show up at multiple events. That is a good sign, according to Foss.

"Many of the students now have an environment where they belong. And for them, the threshold is lower for visiting our drop-in offer," says Foss.

Course for new student teachers

In addition to social evenings, academic events are also organized for the various study programs. Many courses are conducted for new student teachers before starting their important and instructive placements in schools.

Birgitte Øverland is a primary school student teacher with a master's in mathematics. Together with fellow students, she organized three courses in 2022.

"Many students dread their teaching placement and need tips for activities and tasks in various mathematics topics. We go through that in our courses," she says.

There has been good attendance at these courses too. The participants are given activities relevant for their placement and introductory tasks related to various types of mathematics. In addition, they receive basic tips for the placement period.

"The students are content, and many of them come back several times. Many also take copies of the material we present to use in their placement. It is good to see that what we do is useful," says Øverland.

Three of MatRIC drop-in mentors participated in the the Nordic Regional Learning Assistant Workshop at Center for Computing in Science Education (CCSE). Read more about the workshop.

Student teaching assistant camp

10.-11. August 70 students were together at Skottevik camping to learn about what it means to be a teaching assistant in various mathematical subjects at UiA. The training is led by MatRIC.

"We have many good students. We want to make them better equipped to learn mathematics in an educational way", says Thomas Gjesteland, head of MatRIC.

The gathering was attended by students from engineering studies and economics and administration subjects at UiA. Many new students in these studies experience challenges in the practical use of mathematics.

"We have good experience with learning assistants in teaching and group work. They are especially involved in supporting the fellow students in group work and helping them overcome difficulties so that we can get them to the finish line", says Gjesteland.

All assistants and mentors are experienced students and have already spent one or more years on the course they will help with.

Human Connection Competence

An important part for both MatRIC student mentors and teaching assistants is training in interpersonal skills. A safe and good learning environment contributes to increased quality of education. Students learn together with other students – in groups or one to one. The student mentoring schemes at UiA expand training with an emphasis on the psychosocial, how to create security for learning to prevent dropout, provide increased learning joy and as a result - also better results. Read full story.

Student assistants Marjan Daliri, Hallvard Foss, Martin Nordskog and Preben Forsland

Eva Dønnestad train the students in human connection competance.

Fighting failure rates

For several years there has been a high failure rate in mathematics in the business administration program. MatRICs PhD Research Fellow Ida Maria Landgärds is running a popular preliminary course to ensure that more students pass.

"There has been a very high failure rate among business students over several years, sometimes as high as 40 percent," says Landgärds.

She started her PhD in 2018 and has developed the preliminary course that students can now choose to take.

Landgärds aims to increase the students' understanding of mathematics in the first semester to enable them to pass the maths course in the second semester.

"They start with a compulsory test, to map their level. We do this because we want the students to be aware of what they need to work on. This means that some of them can jump in and out of the preliminary course, depending on what they need to learn," she says.

120-150 students every lesson

She had somewhat low expectations for the enrolment in the preliminary course, as it is voluntary and does not award any credits. However, there proved to be no cause for concern about the level of interest.

"On the first day, we booked a room for 70 people, but over 150 showed up. People had to sit on the floor, so after that we moved to a bigger room. There are 120-150 students in every lesson, and many come prepared. These are excellent students who have a desire to improve in maths and succeed in their studies," she says.

The first cohort has now gone through the course, and Landgärds is anxiously waiting to see how they do in the second semester of the mathematics course. There are plans to offer the preliminary course again next autumn.

"In order to create the best possible preliminary course, we have examined the maths textbooks and curricula from upper secondary school, in order to better understand where the students stand when they start university. It will be exciting to see the results. The students have done a great job and were motivated throughout the process. Now I plan to develop the preliminary course further, follow up on the feedback and write more papers for my doctorate," Landgärds says.

PhD Research Fellow Ida Maria Landgärds is working to ensure that more students pass the maths course in the business programme.

Students in Mathematics 1 now get four smaller digital exams instead of one big written exam at the end of the semester.

Maths failure rate drops from 44 to 12 percent

More engineering students pass the exam in mathematics after UiA changed the form of assessment.

"We are very pleased that more students are passing the course, seeing how important it is for their further studies."

That is what Michael Rygaard Hansen says. He is dean of the Faculty of Engineering and Science at the University of Agder (UiA) and board member of MatRIC, and one of the instigators of the change that has now been implemented. For several years, up to 44 per cent of students taking mathematics in the first semester of engineering programmes failed their exams.

In the autumn of 2022, the teaching in the course and the form of assessment for all 400 students were changed. Instead of a large written examination at the end of the year, they introduced four smaller digital exams that are spread across the semester.

There is also an assignment to hand in at the end of the course.

The MatRIC environment has played an important role in the development. The new assessment is based on several years of research and development. Morten Brekke started experimenting with digital assessment already before MatRIC was a centre for excellent in education. The employees involved have extensive experience with mathematics and mathematics didactics. At the MatRIC drop-in center there has been a greater demand after the exam was changed.

Start studying earlier

"We see that the students like the exam format - it is digital and flexible," says Rygaard Hansen.

The digital exams are spread across the semester and students can retake each of them up to five times in a period of two weeks. With the new exam format, the students are inspired to work steadily throughout their course. Many have changed their study routine, and you can see that the student environment has improved.

"We see that they help each other more. After each of the smaller tests, many of the students come together in groups to discuss the solutions and how they can do better. Those who managed to solve a problem teach it to others."

It also allows the students to focus on smaller parts of the syllabus in the lead up to each exam.

"We certainly see an improvement in that many start working earlier on their syllabus and assigned tasks. Many students take the tests several times and get better results each time."

The best result stands.

Random problems and numbers

The smaller exams are digital but are conducted on-site in a large auditorium. This is to ensure the students hand in their own work. The exam lasts one hour, and the students use their own computer. They log into STACK, a program for mathematical assessment. The program makes it difficult to cheat since the students are not given the same problems or numbers.

"The students sit close together and can glance at their fellow students. But there is no use in that since none of them work on the same problem at the same time," says Rygaard Hansen.

An issue with digital exams is that the students cannot show how they arrived at the answer. They just enter the result of their calculations. The program tells you whether the answer is correct or incorrect.

"That is why we also have a maths assignment, in addition to the smaller digital exams. Here the students can show their calculations together with the answers," says Rygaard Hansen.

In the four smaller exams, you can score a maximum of 15 points for each. The maths assignment can earn up to 40 points. It is possible to score 100 points, which means that you need more than 90 points to get the grade A.

Not an easy transition

The change in examination format is a great example of good service development and change at the university. The mathematics environment had for many years seen the need to develop new assessment methods in the subject, but not at the expense of the quality of the exam or teaching. The current vice rector, and board leader of MaTRIC, Morten Brekke, had already accomplished pioneering work - which gave UiA a good basis for meeting the need.

In spring 2022, employees used service development strategy and sprint methodology to find a solution. Rygaard Hansen was clear in his expectations, and the maths environment set aside five days for sustained and intense work on this. The core group consisted of academic staff, representatives from the Exam Office and super users on the relevant IT system.

"It was important that the exam keep a good academic and educational standard. At the same time, the technical and administrative aspects had to be in place," says Rygaard Hansen.

Already this autumn, the assessment form was tested, and the result has exceeded all expectations. There are now many more students who pass, and so far it seems like the learning outcome is better achieved.

According to Rygaard Hansen, the implementation would not have been possible without good internal cooperation.

In addition to development involvement from MatRIC, Sverre Lunøe-Nilsen, the person responsible for the course has done a great job with the development and coding of problems and numbers in STACK. This had to happen in order to make it technically possible to implement.

Administrative staff have also been key to making this happen. Rygaard Hansen particularly highlights the good cooperation with both the Exam Office and the Division of IT.

"They have been important. They know the protocols, systems and frameworks we have to stay within," Rygaard Hansen says.

The new exam format is now also being used in Mathematics 2, which takes place in the second semester of engineering programmes.

Math students helped Jo Røiselien with the videos about statistics.

Small boxes was used to visualize statistic challenges.

MatRIC TV

MatRIC TV are online videos to support students' transition from school to higher education mathematics. So far MatRIC TV has more than 70 videos covering school mathematics topics. In 2022 MatRIC engaged Jo Røislien, known from various NRK series about mathematics, to come to UiA and produce 16 video films about statistics. Scripts were created from a resource group of other well-known mathematics teachers, and filming was done together with our students from both UiA campuses. UiA students were used in the videos as extras. The films will be posted on MatRIC TV and complement the collection of mathematics videos that are already there.

Transforming mathematics teaching

MatRIC wants to build up the community of practice in mathematics education. MatRIC will continue to facilitate further exchange of experience, expertise, and good practice between mathematics teachers within Norwegian higher education institutions and connect these with international exemplars of best practices in teaching and learning mathematics. Specific objectives in the development of practice are the inclusion of research and development within regular teaching, and the comprehensive inclusion of students as partners in the educational process.

MatRIC's annual conference

The annual MatRIC conference is an important arena for dissemination. International experts are invited to present leading work on teaching and learning of mathematics in higher education to the Norwegian community. The conference is also an important arena for networking. After two years of the pandemic, we could finally have a physical conference, where we share ideas, get new impulses and build networks.

The conference took place on June 1st and 2nd in Kristiansand. Topics of discussion included assessments in mathematics, mathematics support centers, and inquiry-based mathematics teaching and learning. The conference was held at the Thon Hotel Norge Kristiansand. There were over 70 participants attending who represented a very pleasing spread across the Norwegian higher education institutions (10 institutions), and international participants (8 institutions represented). Program.

Course for mathematics teacher educators

Quote former participant:

> *" The scheme of the entire study is very well planned. Everything from lecturers, curriculum activities and selected meeting places in Norway create good conditions for the conscious implementation of appropriate mathematics didactics that make a difference. We get the opportunity to influence attitudes towards mathematics in school through both good and bad examples".*

The Course for Mathematics teacher educators brings together teacher educators with strong mathematical backgrounds, teacher educators who want to qualify as associate professors, and teacher educators who want to improve their teaching and supervision skills.

The program gives the opportunity to develop competence in teaching mathematics in teacher education. The course is developed by MatRIC and the Norwegian Centre for Mathematics Education at NTNU. The organizers are Linda Opheim and Simon Goodchild from MatRIC. UiA organize this course together with Raymond Bjuland, Janne Fauskanger and Reidar Mosvold from UiS, and Kjersti Wæge Director, Norwegian Centre for Mathematics Education at NTNU.

It is researchers from NTNU and the UiA who are behind "Mathematics for teacher educators". Here we see one of the subject managers, Raymond Bjurland (left), in discussion with participants during the gathering at Kalvskinnet NTNU.

The program is two years long, with four meetings per year, and focuses on exploring teaching practices that engage teacher students and support their development as future mathematics teachers. As an outcome of the course, the participants shall write a research article on their own teaching. In 2022 the course had 4 sessions. More information.

Computer Aided Assessments

MatRIC has developed a Norwegian network for Computer-Aided Assessments (CAA). Niclas Larson leads this network. How to use CAA to improve the teaching and learning of mathematics is one of MatRIC's goals. MatRIC has built a strong international and national network with world-leading experts in the use of CAA.

MatRIC has taken the initiative to host a Moodle server, which is used also by other Norwegian institutions, to test and use the software STACK. STACK is the world-leading open-source automatic assessment system for mathematics, and it is the system that is used for the new assessment for engineering students at UiA.

MatRIC and NTNU organized the 1st Norwegian STACK/Moodle Workshop In Ålesund 8.-9. August 2022. The workshop's aime is to bring together educators, researchers, and practitioners with an interest for Computer-Aided Assessments in mathematics, sciences, and programming. It consisted of a mix of best practice presentations, experience exchange, and a tutorial where participants could get hands-on with the Moodle/STACK environment.

Sharing experiences about good practices

MatRIC drop-in is part of an international network for sharing ideas in math support centers.

The Project "Capacity Building in Mathematics and Statistics Learning Support in Norway and the Czech Republic (MSLS Net)" aims to improve cooperation in learning and teaching mathematics and statistics between higher education institutions in the Czech Republic and Norway.

The goal is to share experience in MSLS provision outside the classroom, promote the idea of MSLS in higher education and support the development of national MSLS networks.

The project participants include the Brno University of Technology, Masaryk University, The Arctic University of Norway, The University of Agder, and Tomas Bata University in Zlín.

The project will produce two intellectual outputs: the development of training materials for students and mentors of mathematics and statistics support centers, and a handbook on good practices in mathematics and statistics support centers.

The project includes four peer learning events focusing on aspects of mathematics and statistics support, and two multiplier events in the Czech Republic to boost the development of national MSLS networks and cooperation between higher education institutions in the two countries.

The University of Agder team will specifically contribute to the production of videos in mathematics for Mathematics Support Centers, writing a good practice book about the establishment of a Mathematics support center, development of a questionnaire for Mathematics Support Centers. The MSLS network had its meeting in Kristiansand in June 2022. Svitlana Rogovchenko is the coordinator for this project.

Project period is from September 1 2021 to July 31 2023.

The Norwegian Mathematical Council annual meeting

21.-23. September MatRIC hosted the annual meeting for The Norwegian Mathematical Council. The council is an independent entity whose mission is to advice government agencies, the Norwegian universities and colleges, and others in matters concerning mathematics education and research policy.

Its membership consists of the universities of Norway as well as those colleges offering a substantial mathematics program, plus representatives of mathematics teachers in the school system and some other interested parties.

Stig Eriksen and Linda Gurvin Opheim from MatRIC have been part of the Norwegian Directorate for Education and Training working group to provide advice on changes in the mathematics examination in high school. The report of the working group was presented and debated at the annual meeting.

The Norwegian Mathematical council was also informed by the MatRIC active learning survey presented by Christin Borge fom UiO.

Martin Nordskog and Halvard Foss from MatRIC drop-in presented how MatRIC work with students as partners in the math support center and how it is to be a student in post corona times.

Study trip Aalborg

11-12 of May, 13 people from MatRIC travelled to Denmark to learn and be with our colleagues at Aalborg University. They have long and useful experience with problem-based teaching and alternative forms of assessment for first-year engineering students (First Math).

The students also shared how it is to be an engineering student at Aalborg University and work in a project. Their semester starts with a high degree of teaching, and ends mainly with project work.

Nordic Journal of STEM education and MNT-conference

Nordic Journal of STEM education is a scholarly peer-reviewed, open-access journal publishing in the broad field of educational development in Science, Technology, Engineering, and Mathematics (STEM) Higher Education and it is closely connected to MNT-conference.

The MNT conference is a biennial scientific conference on teaching and learning. The aim is to contribute to the development of a culture for a scientific approach to teaching and learning within the STEM field – a scholarly approach to planning, carrying out, evaluating, assessing, and reviewing teaching and learning. In other words, fostering a Scholarship of Teaching and Learning (SoTL) culture.

Thomas Gjesteland from MatRIC is currently the editor-in-chief for the Nordic Journal of STEM education (NJSTEME). The editors of the journal have taken initiative to include more colleagues to publish their results on research on their own teaching.

MatRIC together with BioCEED and UiS organized the workshop "From Practice to Publication" in Oslo on March 7. and 8. 2022. The workshop aimed at guiding authors in the development of a manuscript for the Nordic Journal of STEM Education. The workshop had 20 participants from different Norwegian institutions.

Research and development-based mathematics education

MatRIC's goals are to transform students learning experiences in mathematics and to transform mathematics teaching. For MatRIC it is highly important that the innovations and actions are motivated by research. MatRIC has a world-leading research group in university mathematics education that publish and disseminate results in recognized journals and conferences.

Highligts from MatRIC PhD research

Ida Maria Landgärds research concerns the teaching of service mathematics to economics students. The focus is especially on investigating issues around the transition from school mathematics to the mathematics for economists' course at university. Poor performances and high failure rate in the compulsory mathematics course has endangered the continued inclusion of all students in the University Economics program. As part of her PhD project, she has designed and implemented a diagnostic test followed by a blended learning pre-course for the economics students, with the intention to give all students opportunity to learn the basic mathematics.

Ninni Marie Hogstad investigates first year engineering students' learning processes when they use a digital tool called Sim2Bil in group tasks. In these tasks they use calculus to make an animation of two cars to behave in certain ways, and thus they work in an interdisciplinary collaboration between mathematics and physics. By studying their discourse, we get insights in how they communicate mathematically with each other, which challenges they meet and how they navigate between different disciplinary discourses.

Maboubeh Nedaei investigates engineering students' approaches to mathematical learning when they learn higher mathematics with different learning goals. Moreover, bio sensing technology will be used to measure indicators of students' cognitive activity while learning mathematics and facilitate inferences about their learning approaches.

Siri Ovedal-Hakestad is looking into what students in higher education do when engaging in mathematical digital tasks. The inquiry will investigate students working styles through videotapes and interviews. Throughout one semester pre-service teachers have been engaged in different task types in the digital assessment system STACK

Yusuf Feyisara Zakariya (post doc)
The motivation for the project is the recurrent poor performance in the first-year calculus course among engineering students. The overarching goal of the project is to improve students' performance in the course. The project focuses on investigating the teaching methods and feedback delivery, assessment tasks (i.e., alignment between exams, intended learning outcomes, and teaching-learning activities), and interventions on students' factors such as self-efficacy as proxies to improve students' performance in the course. The research approach is mixed methods involving both qualitative and quantitative methods of data generation, analysis, and interpretation.

Active learning approaches in Norwegian Higher Education courses

MatRIC and The Norwegian Mathematical Council entered into collaboration to explore the incidence of active learning approaches in Norwegian higher education mathematics classes.

A small research group comprising a mathematician, a statistician and three mathematics education researchers was composed from MatRIC and NMR's Teaching Committee. A survey instrument was developed and distributed through NMR's campus representatives at the end of 2019. The research group has spent the ensuing months analyzing and disseminating the results (e.g., MNT conferences, MatRIC's conference in 2022, and NMR's annual meeting in 2022, the staff development unit at UiO). Most recently, the research group has met with NOKUT and compared outcomes between MatRIC's survey and NOKUT's "Underviserundersøkelsen".

Given the complementary nature of the two surveys, the possibility of inserting items from MatRIC's survey into the next round of NOKUT's survey are being actively explored. A noteworthy indication from MatRIC's survey, which we want to follow up, is that UniPed courses do not, on their own, appear to have a positive influence on the use of active learning approaches. Teachers who combine other forms of teacher education with UniPed do appear to be more likely to employ such approaches.

However, it appears that overall the use of active learning approaches in Norwegian higher education mathematics is rather modest; this is a matter of concern because the international evidence points firmly to a positive relation between active learning approaches and improved student performance. The research group is working on papers to publish in international journals and hopes to continue their inquiries and dissemination throughout the coming year.

MatRIC Grants

MatRIC grants are research and development grants of up to 50,000 NOK. The projects should contribute to the development of mathematics teaching in higher education. The grants are open to lectures in Norwegian institutions and students at UiA. In 2022 MatRIC has granted two projects:

- André Martiny og Henrik Kjelsrud «Mastery-based assessment». This project will develop mastery-based assessment for the course MA-173. The goal is that the assessment form should be in line with a thinking classroom. That is, we want the assessment form to contribute to thinking and active students. MA-173 is the first mathematical course that GLU students encounter in teacher education.
- Said Hadjerrouit "Mathematics education, programming, and computational thinking in higher education". This project explores the affordances and constraints of programming and computational thinking activities for mathematical problem-solving by combining theoretical insights, literature review in the field, and empirical data in a mathematics classroom setting.

Dissemination of knowledge and practices

MatRIC is a dynamic center which integrate actions and dissemination. All MatRICs actions has embedded dissemination. For example, MatRIC drop-in the Course for mathematics teacher educators, the annual conference, workshops and the Learning assistant program, are both an action that also has a dissemination part. MatRIC disseminate the work of the centre through publications in international journals and conferences. The publication list is attached to this report.

An example of impact is that Linda Gurvin Opheim has been invited to be part of the Norwegian Directorate for Education and Training working group to provide advice on changes in the mathematics examination in high school. Read full story about this.

MatRIC is present at the most important international conferences in the field of research in university mathematics education. During 2022 MatRIC was present at:

- Indrum 2022
- SEFI 2022
- International Meeting of the STACK Community 2022
- CERME12
- KLæM
- Norsk matematikkråd årsmøte
- 34th Norwegian ICT Conference for Research and Education, NIKT 2022

Podcast

Niclas Larson from MatRIC is producing the podcast «Spøkelser etter avdøde størrelser». The podcast includes informal discussions about mathematics.

Further progress

MatRIC will continue to work to establish its place within UiA. For the last year as a center for Excellent in Education, MatRIC will focus on establishing its activeties within UiA.

MatRIC will continue to be a world-leading research group in university mathematics education. The research group will continue to hold its networks and find new partners.

MatRICs work within student partnership, drop-in and learning assistants will be grounded at the Faculty of Engineering and Science. MatRIC will merge with FYSE (First Year Study Environment) and continue to develop drop-in and student mentors.

UTFORSK-project

The project "Building Interdisciplinary STEM Education Research through Equity and Problem-Based Learning" (UTFORSK) has been funded. In this project MatRIC will continue to work with students as partners in collaboration with Clemson University for the period 2023-2026.

This project will establish an institutional partnership between the University of Agder and Clemson University based on collaborative research-based activities that promotes the development of new knowledge in STEM education and didactics.

Our goal is to foster our partnership through the development of technology-enhanced problem-based learning with a focus on promoting inclusive and equitable STEM education, and elevating students as partners in the development of mathematical support.

Calculus conference

MatRIC will sponsor and organize the conference "The learning and teaching of calculus across disciplines" together with the University of Bergen 5.-9. June 2023. This is a follow up on the international research conference on teaching and learning Calculus organized by MatRIC in 2019. In this conference we ask the questions how biologists, chemists, economists, engineers and physicists understand and use calculus concepts in their disciplines. And what does that imply for the teaching and learning calculus in their disciplines. This conference seeks to explore these complex questions by bringing specialists from these disciplines together with mathematics educators.

STACK conference

NTNU and MatRIC will follow up in the first Norwegian STACK/Moodle Workshop and organize a new conference in Trondheim in may 2023.

Finances

MatRIC receives NOK 4 million from HK-dir. In addition, we receive NOK 3 million from the University of Agder and NOK 1 million from the Faculty of Engineering and Sciences at UiA. In addition to this, we are supplementing with 1 Post Doc and 1.5 PhD positions for MatRIC for 2022.

We are now up with a full program when it comes to dissemination, but are still expe-riencing some after-effects after the corona pandemic, and see that it is more challenging to get people to attend conferences, work-shops ect. this year as well.

MatRIC Accounting 2022		
Project	Income 2022	
801052	Income from HK-dir	- 4 000 000
453292	Income from UiA	- 4 000 000
	Total income 2022	- 8 000 000
	Costs 2022	
	Equipment	117 000
	Salary costs	6 362 000
	Travel costs	627 000
	Decimination, Other costs	1 050 000
	Total cost 2022 before PhD cost	**8 156 000**
	Phd cost 2,5 positions	3 054 000
	Total cost include PhD cost	**11 210 000**

MatRIC team

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Centre leader

Simon Goodchild
Professor

Lillian Egelandsaa
Project manager

Elisabeth Rasmussen
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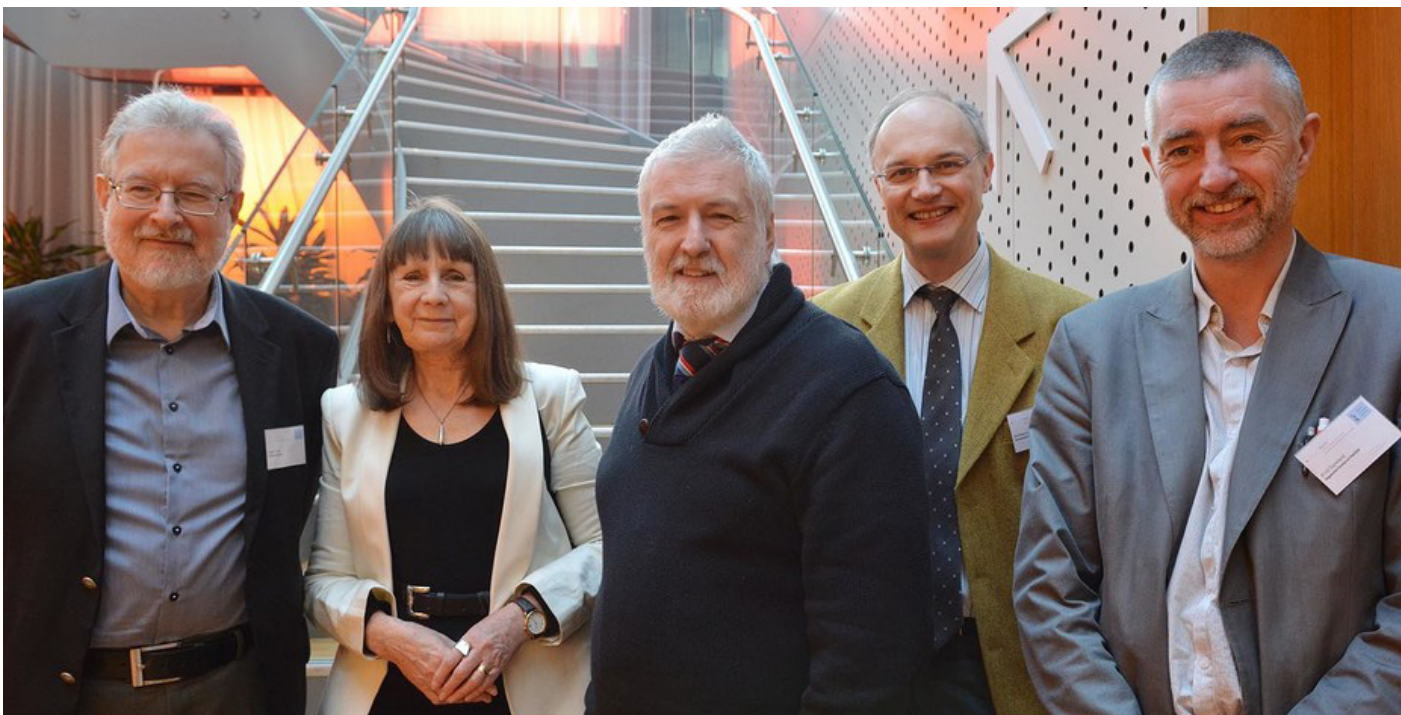

Publications and conferences

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Brekke, Morten (2022) Transforming Mathematics teaching –why and how? 28th Nordic Congress of Mathematicians Aalto University, Finland, August 18-21, 2022

Gjesteland, Thomas (2022) Scholarly approaches to Teaching and Learning. the 34th Norwegian ICT Conference for Research and Education, NIKT 2022.

Kanwal, Shaista (2022). Developing an analytical model for mathematical reasoning. Proceedings of the Twelfth Congress of the European Society for Research in Mathematics Education (CERME12). ISBN: 979-1-22-102537-8. *European Society for Research in Mathematics Education*. TWG17/hal-03749222.

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Larson, Niclas (2022) Use of small tests to enhance students' performance. International Meeting of the STACK Community 2022; 2022-04-24 - 2022-04-28

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Opheim, Linda Gurvin; Bjuland, Raymond; Fauskanger, Janne; Goodchild, Simon; Mosvold, Reidar; Wæge, Kjersti. (2022) Professional development for mathematics teacher educators. 12th Conference for European Research in Mathematics Education.

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Opheim, Linda Gurvin. (2022) Lær barna å bli glad i matteleksene. Kurs for foreldre i regi av Tekna.

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