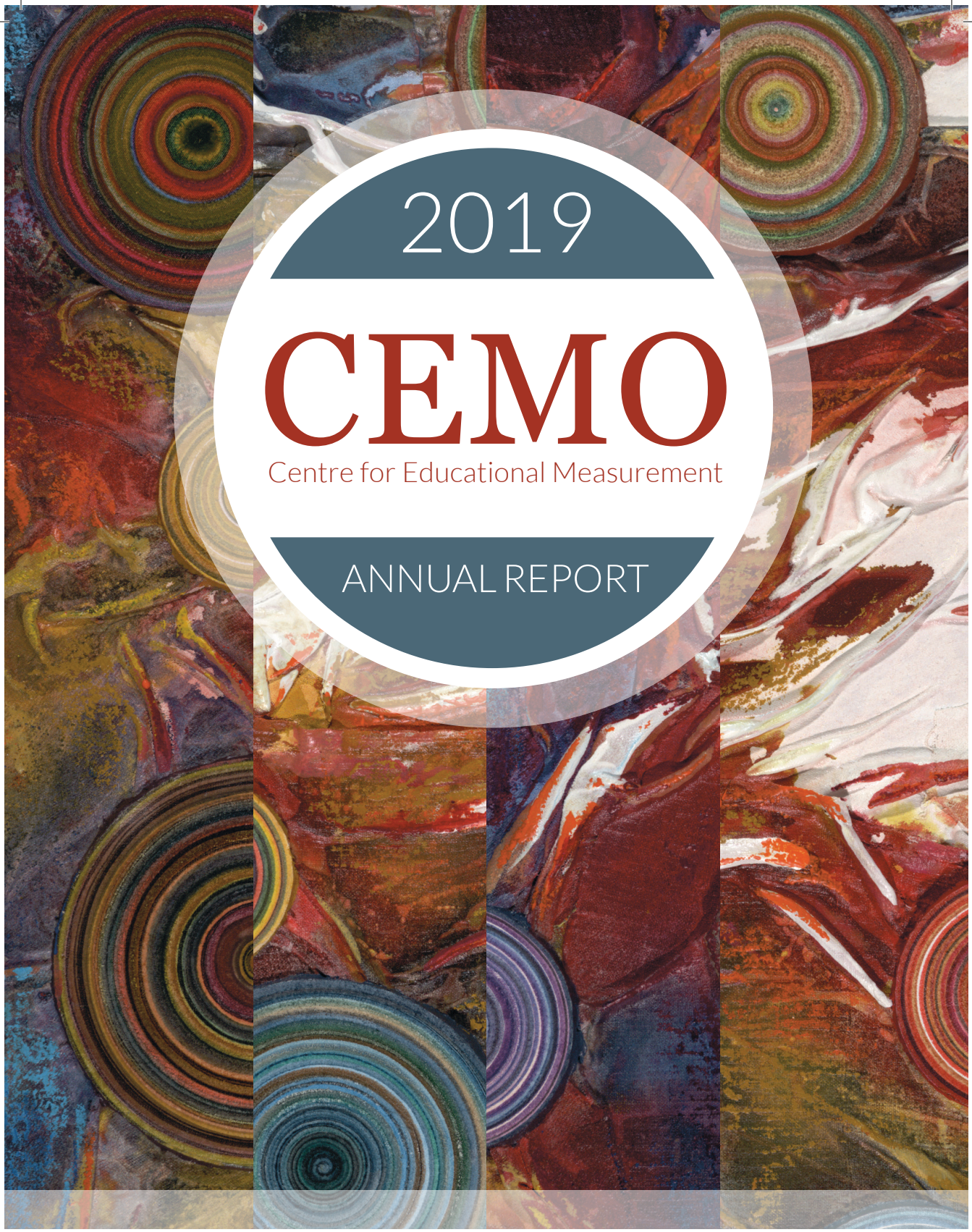


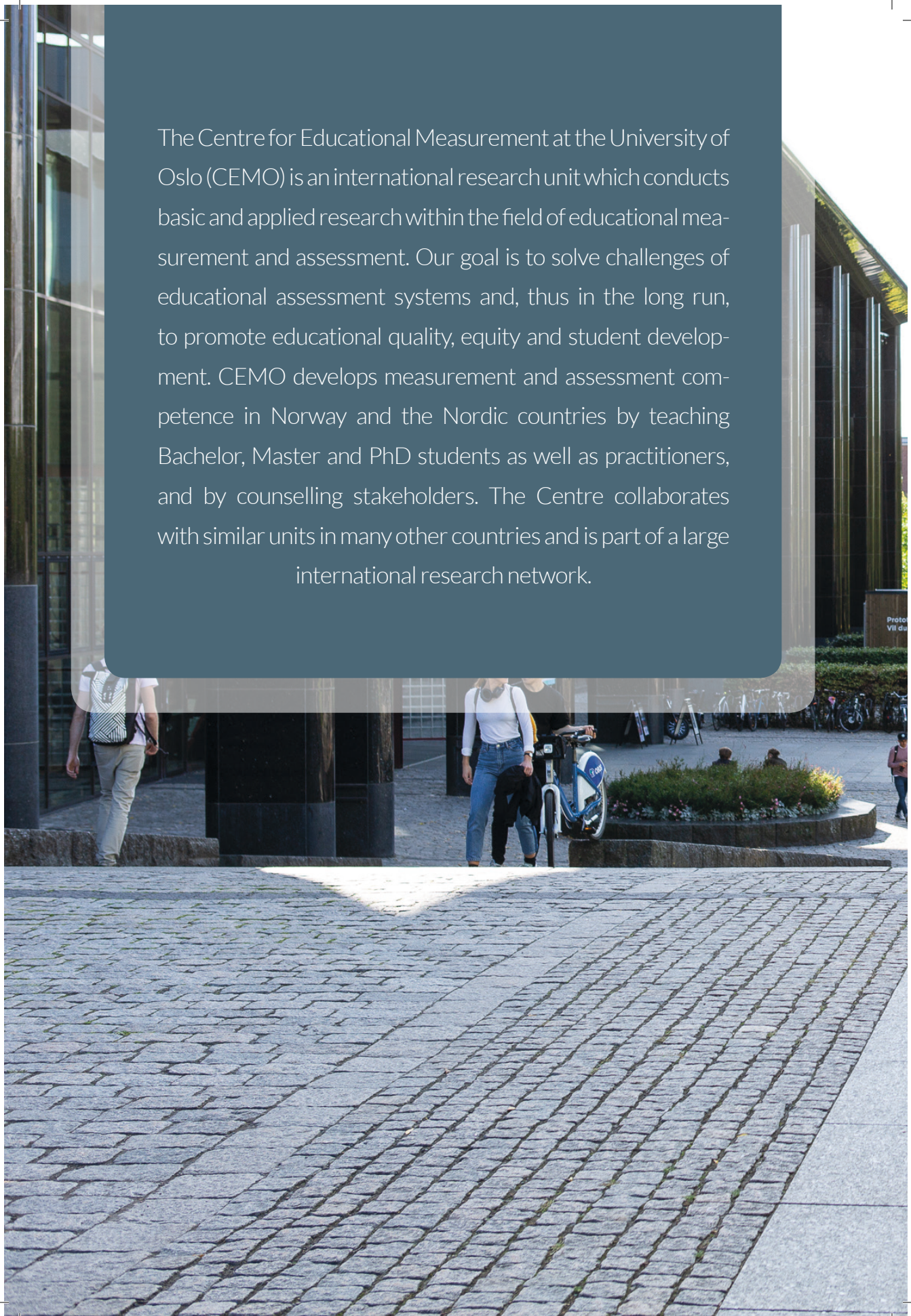
2019

CEMO

Centre for Educational Measurement

ANNUAL REPORT

UiO : Faculty of Educational Sciences
University of Oslo



The Centre for Educational Measurement at the University of Oslo (CEMO) is an international research unit which conducts basic and applied research within the field of educational measurement and assessment. Our goal is to solve challenges of educational assessment systems and, thus in the long run, to promote educational quality, equity and student development. CEMO develops measurement and assessment competence in Norway and the Nordic countries by teaching Bachelor, Master and PhD students as well as practitioners, and by counselling stakeholders. The Centre collaborates with similar units in many other countries and is part of a large international research network.


Prototype av nye studentboliger
Vil du se inni? Kikk rundt hjørnet!

CEMO 2019 IN BRIEF

The Centre for Educational Measurement at the University of Oslo (CEMO), chaired by Sigrid Blömeke, is now in its seventh year and includes more than 25 team members: four (associate) professors, four professor IIs, three postdoctoral fellows, ten PhD candidates, three administrators and four student assistants.

In 2019, CEMO's first PhD candidate Stephan Daus successfully defended his doctoral dissertation *Profiling and Researching TIMSS by Introducing a Content Lens on Eighth-grade Science (PARTICLES)* at the Faculty of Education. With the Gustafsson-Skrondal visiting scholar Isa Steinmann, CEMO was able to recruit an expert in the field of educational effectiveness research and international comparative research.

2019 has been a successful year for CEMO employees. Our director, Sigrid Blömeke, received the University of Oslo's Research Award for her contributions to the field of educational assessment. Isa Steinmann, our Gustafsson & Skrondal Visiting Scholar, received the Rudolf Chaudoire Award 2019. The award honors her efforts to foster the international relations of Technical University of Dortmund, Germany, through high-quality cooperative research. Our PhD student Kondwani Kajera Mughogho and former PhD student Stephan Daus won the best poster awards at the IEA International Research Conference in Copenhagen.

CEMO (co-) authors published some 30 scientific articles in 2019. The majority of these appeared in journals on the highest quality level (2) according to the Norwegian publication system. Director Sigrid Blömeke and Professor Ronny Scherer were recognized for being among the 30 researchers publishing the most in Norway.

We could further strengthen our portfolio of external research grants and at the same time expand our good work relations with the other departments at the Faculty of Educational Sciences as part of our success with an application for the evaluation of *Fagfornyelsen*, the large reform of the school curriculum to be implemented in Norway in the fall 2020. The research project is a joint effort of all four units based at the Faculty. Both the CEMO director and deputy director were involved in large evaluation processes of national assessment systems: Rolf Vegar Olsen in Denmark and Sigrid Blömeke in Norway. Such tasks are very informative because they provide new insights into the discourse on assessment. Furthermore, they are crucial parts of our public service work.

In August 2019, CEMO welcomed the second cohort of students to our Master of Science in Assessment, Measurement and Evaluation. As is typical with a new program, we are facing some challenges but so far both students and teachers are enjoying the classes and discussions. CEMO has in addition contributed with PhD supervision and a range of teaching activities at other research units.

During 2019, CEMO further developed both the Norwegian and English websites. Numbers of followers on social media increased significantly.

THE DIRECTOR'S COMMENTS

CEMO is now in its seventh year. As the centre's director, it's a pleasure for me to conclude that we continue to succeed with our mission. Research, teaching and outreach activities are developing dynamically, and we are adjusting our profile and structure to new experiences.

A highlight this year was that we could take in the second cohort for our Master of Science in Assessment, Measurement and Evaluation program. We had a decent number of applications and could fill all study places. With the Master's program, CEMO also contributes strongly to PhD training at the Faculty of Educational Sciences because candidates can take most of our courses as part of their PhD program. It is very rewarding to serve the larger educational research community in this way.

Welcoming new team members and seeing former team members succeed in new positions is one of the most enjoyable tasks of a director throughout the year. We were again very lucky with our recruitments and could welcome several new team members this year. Ronny Scherer is back at CEMO after he'd been recruited as a professor by the Department of Teacher Education and School Research right out of his Postdoc position at CEMO. Ronny is specialized on substantive and methodological research around computer-based assessments with a focus on the assessment of complex skills such as adaptability. In addition, Jarl Kleppe Kristensen and Maoxin Zhang joined CEMO as PhD candidates and Chia-Wen Chen as Postdoctoral Fellow.

Gunnhild Nedberg Grønlid has taken over the position as Higher Executive Officer after Øystein Andresen, who moved to the Faroe Islands. From the start, Gunnhild has provided excellent administrative support of our CEMO activities. I would like to use this opportunity to thank Øystein for his many years at CEMO and to wish him all the best for his future career.

My personal highlight in 2019 was without a doubt the ceremony in the historic University Aula surrounded by Edvard Munch's paintings. Here I received the University of Oslo's Research Award. It was a very impressive ceremony with Munch's Historien on the left, Alma Mater on the right and Solen straight ahead. I felt that these paintings nicely reflect what CEMO stands for: a community of researchers committed to providing better knowledge about learning and development of children through educational measurement.

I am much looking forward to 2020 and do have great expectations. We will host the FREMO conference for the second time, and we will apply for a Centre of Excellence together with colleagues from the Faculty of Educational Sciences. Our first Master students will graduate and present their works to the public. All these and other activities will pose new challenges and, more importantly, they will be a lot of fun.

Comments by the CEMO Board chair: Rita Hvistendahl

The CEMO Board has had three meetings in 2019; on 1 March, 9 April and 27 November. A number of issues were also decided upon in an electronic board meeting on 24 September.

The most important issue for the 2019 meetings has been to announce and fill positions. The Board has had the great pleasure to welcome Ronny Scherer as a full professor at CEMO. Professor Scherer's research focuses on substantive-methodological synergisms in the broad areas of science education, computer-based assessment and problem solving. The CEMO board would like to thank the committee as well as the interview committee for their great efforts.

Furthermore, the CEMO board welcomed Jarl Kleppe Kristensen and Maoxin Zhang as PhD Candidates and Chia-When Chen as Postdoctoral Fellow. The reports from the evaluation committees have been of a high standard, documenting that all applicants have been considered in a transparent and fair evaluative process. The Board also welcomed Isa Steinmann as Gustafsson-Skrondal visiting scholar.

At a meeting with the Secretary of the Ministry of Education and Research on 28 August, CEMO presented the status of the new Master Program in Assessment and Evaluation, and outlined impressive scientific activities for the next few years. During 2019, CEMO also hosted groundbreaking seminars on Fagfornyelsen and the Norwegian exam group report.

The Board highly acknowledges what CEMO has accomplished during 2019. Particularly, the CEMO board congratulates Centre director, Professor Sigrid Blömeke with the University of Oslo Research Award for 2019.

TABLE OF CONTENTS

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1. Research at CEMO

Basic research is the primary task for CEMO, and team members are specialized in psychometrics and latent variable modelling, the development of innovative assessment formats as well as linking and equating of data. These methodological issues frequently appear in different substantive areas where CEMO researchers are involved: from measuring socio-emotional and cognitive educational outcomes, via large-scale assessments and twenty-first century skills, to examination models with objective structured clinical examinations. A special highlight in the latter respect is our collaboration with the Faculty of Medicine. Both units are contributing with substantial resources to examine grading and classification challenges with the homogenous small samples typical for medical education.

CEMO is firmly established as a research center: high quality of publications, successful in competition for external grants, successful in terms of recognition. The Centre has built up its research portfolio around four themes: modern test design, statistical methods for innovative assessments, educational measurement in the Norwegian context, and international large-scale assessments. CEMO is thus covering research areas not well covered in Norway or the Nordic countries.

CEMO strives to move the field of educational measurement forward so that we can solve the challenges of educational assessment systems and, thus in the long run, can promote educational quality. This includes examining the psychometric quality, fairness and effectiveness of assessments and diagnostic tools including the development of new measurement approaches.

A new Nordic network in Educational Measurement

A special objective of CEMO is to contextualize educational assessments in the societal and cultural characteristics of the Nordic countries. We have therefore established a new network for Educational Measurement and Assessment as part of the Nordic Educational Research Association (NERA): https://neranetwork1.wordpress.com. CEMO professor Rolf Vegar Olsen is the network's convener. Jeppe Bundsgaard, Mari-Pauliina Vainikainen, and Christina Wikström are his co-conveners from Denmark, Finland, and Sweden.

The purpose of the network is to create an arena for exchanging research ideas and planning research collaborations across countries. The network is open for researchers working with questions related to educational assessment, for example research targeting innovative assessment formats, comparisons of assessments across the Nordic countries, use of assessment data for accountability and/or school development, issues of validity, fairness and equity in assessment, psychometric theory and practice.

The research group FREMO

FREMO was established in 2018 and became fully active in 2019. The research group focuses on cutting-edge research and advanced training of PhD candidates and Master students in the field of educational measurement. FREMO includes all academic CEMO employees and is open for members from other departments at the Faculty of Education. FREMO serves to build up an internationally recognizable research profile and to address measurement issues of specific relevance in the national context.

The FREMO leader is Associate Professor Björn Andersson who is a specialist in item response theory and equating/linking in educational assessment and who is involved in various applications in education, gerontology and psychology. Andersson, who has a background in statistics, thus represents the profile of CEMO by combining strong methodological expertise with applied research in education and other fields.

The FREMO conference is a milestone activity for CEMO, both as an arena for dissemination, but also for facilitating networking and future collaborations. The FREMO conference was arranged for the first time in 2018 and will be arranged for the second time in 2020. The purpose is to provide a platform for research within educational measurement across the world and particularly in Europe.

PhDs and PostDocs at CEMO

A core task of ensuring sustainable research activities is the training and support of PhD candidates and Postdoctoral fellows. These two groups are therefore our most valuable resources when it comes to long-term effects of CEMO's work.

CEMO's supervision guidelines describe how to initiate, establish, and maintain a PhD project. Furthermore, they describe expectations and responsibilities for both the candidates and the supervisors. Supervision of a PhD candidate needs to seek a balance between support by the supervisor and independent development of the candidate.

To support the career development of PostDocs, CEMO has installed a PostDoc coordinator (Ronny Scherer) and established a mentor program. The coordinator serves as the main contact person at CEMO and helps with selecting both an internal and an external academic mentor. As part of the mentorship, PostDocs are encouraged to complete an individual development plan (IDP), which is a tool designed to serve as a road map for the post-doctoral experience. The external mentor should be selected from another country than Norway where future career opportunities may exist. CEMO covers travel expenses for visits.

2. Teaching at CEMO

CEMO is involved in a range of teaching and development activities from the BA through the PhD level to professional development. We regard the relation between research and teaching as a two-way street where both are mutually dependent on the other.

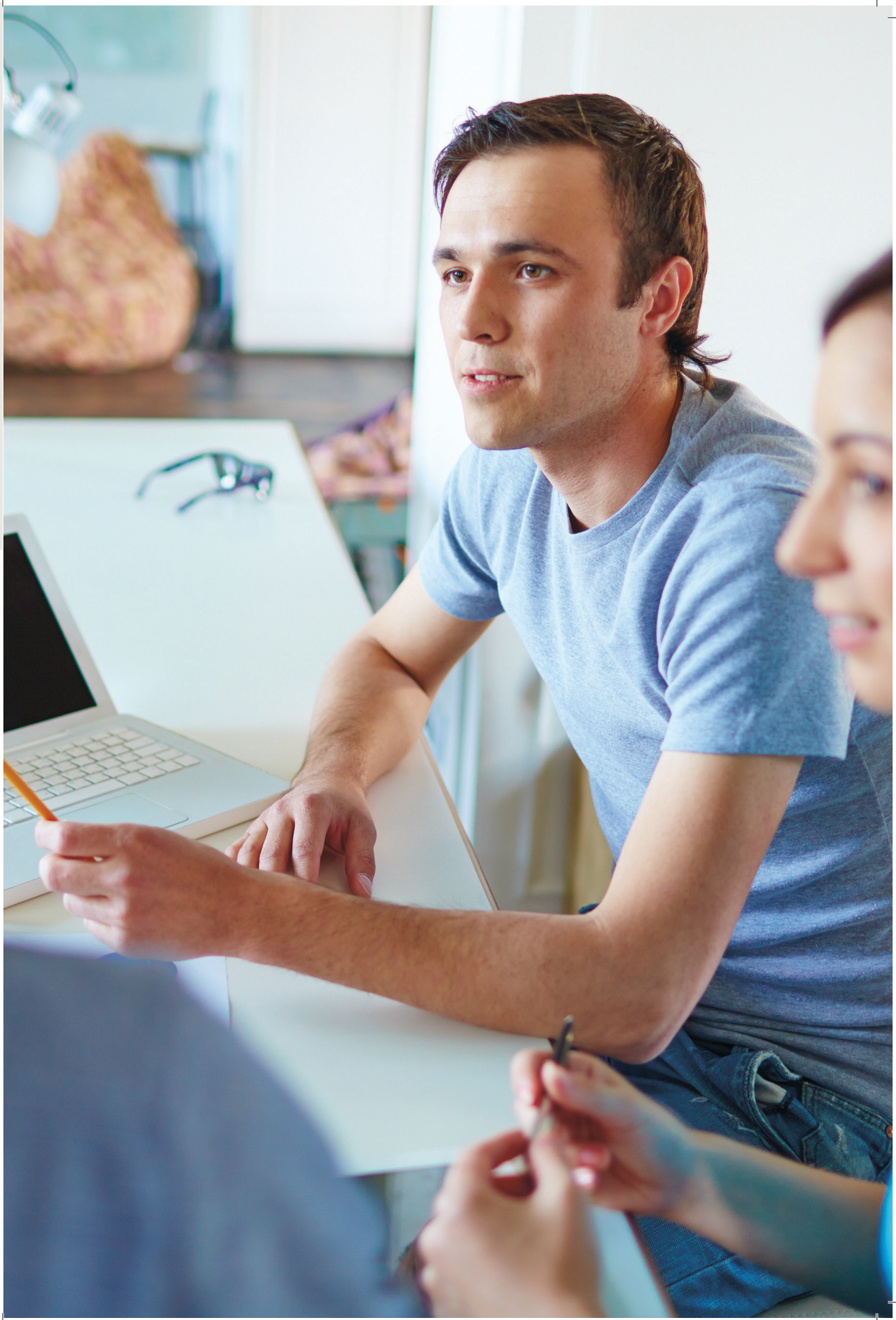
The Master of Science in Assessment, Measurement and Evaluation (MAE) program is our most important long-term contribution to serve sectorial needs. The program, led by Professor Johan Braeken and study coordinator Siri Heslien, provides specialized training in developing and administering measurement instruments, analyzing data, and reporting results from assessments, measurements or evaluations as the first and only program in the Nordic region.

First cohort 2018 – 2020

The first MAE cohort will finish its program in the spring 2020. They have then received a packed two-year program that has provided students with the interdisciplinary knowledge and skills needed to succeed as assessment professionals. Throughout the program, students had to deliver research reports, work collaboratively, present their findings to multiple audiences, and respond to feedback from peers. They have developed algorithmic skills in statistical computation and are familiar with the open-source software R. CEMO has signed agreements with several Norwegian research institutes to give students the possibility to write their Master thesis in collaboration with practitioners working in the field and potential employers.

Second cohort since 2019

For the second cohort, CEMO received more than 100 applications out of which 28 full-time students started at the end of August 2019. The program started with a Data Science class (taught by Johan Braeken) that provided not only the basics for everyone intending to work or do research in the fields of assessment and evaluation but also introduces the students to the open-source software R. Currently students are taking the follow-up classes Constructing Measures (Rolf Vegar Olsen) and Principles of Measurement (Björn Andersson) before they will go over to Measurement Models (Ronny Scherer and Denise Reis Costa) in the spring. In parallel to these courses, topics such as Research Seminars and Current Topics and Debates in Assessment and Evaluation have to be taken.



3. Outreach Activities

An explicit assignment to CEMO is to reach out to non-specialists related to the educational sector and in need of knowledge about measurement, assessment and evaluation. Educational measurement often has profound impact both on individuals and on processes and outcomes of teaching and learning. This, in combination with the fact that educational measurement is often technically complex, generates different information needs on the side of students, parents, teachers, school-leaders, politicians and administrative bodies.

Evaluation of the Norwegian system of school exams

In 2020, a large curriculum reform will be implemented in Norwegian schools. As part of this change, the Ministry of Education and Research established a group of experts in 2018 whose task was to evaluate the exam system in place at the end of primary and secondary school education. CEMO director Sigrid Blömeke has been leading this work. The group included a broad range of teacher and student unions as well as researchers. Most of the work has been carried out in 2019.

Firstly, the exam group delivered a summary of the state-of-research on exams in Norway with a particular focus on their validity, reliability and fairness, see www.udir.no/tall-og-forskning/finn-forskning/rapporter/Kunnskapsgrunnlag-for-evaluering-av-eksamensordningen/. This report was published in February 2019 and presented to a large auditorium at the University of Oslo during a seminar organized by CEMO's deputy director Rolf Vegar Olsen.

Secondly, the exam group provided feedback to all subject-specific curriculum groups in March 2019 on their suggestions for learning objectives and how to evaluate these to ensure that subject-specific changes are in line with the overarching suggestions.

Thirdly, the exam group published short-term recommendations in August 2019 that can be implemented from the start of the curriculum reform, see https://www.udir.no/tall-og-forskning/finn-forskning/rapporter/vurderinger-og-foreløpige-anbefalinger-fra-eksamensgruppa/. Several of the suggestions will need a change in the formal regulations of the exams and were therefore sent to a public hearing that will take place spring 2020. Short-term recommendations include, for example, larger variation in exam formats and exam tasks, among others through use of digital technology, stronger quality assurance, abandoning the random draw of students with respect to exam subjects and formats, strengthened involvement of students through the opportunity to select parts of the exams, and changes in the calculation of the final grade point average with a particular focus on pass/fail regulations.

The group's final report is expected to be published in March 2020. In this report, long-term suggestions will be discussed in a 10-year perspective.

Websites and social media

During 2019, CEMO further developed both the Norwegian and English websites. Numbers of followers on social media increased. Both Twitter (617 followers) and Facebook (1081 followers) were used actively to spread information about CEMO's research activities, possibilities, and cooperation. On the websites, the main features remain the personal pages for each CEMO member, information about CEMO's research and teaching, upcoming events, and the list of publications. Overall, our websites had over 65.000 hits in 2019.

4. Summary of goal accomplishment in 2019 and outlook to 2020

The CEMO team has developed a 3-year plan with specific short-, mid- and long-term objectives for 2019 to 2021 regarding research, teaching, outreach and organization. The plan is updated regularly. In the following, we look back at our goals in 2019 and provide insight into our plans for 2020-2021.

Research 2019 – 2021

Our overall objective regarding research over the years 2019 to 2021 is to sharpen and strengthen our research profile and visibility nationally and internationally to accomplish our long-term goal of becoming the leading Nordic and European centre within educational measurement. This means among other objectives to:

- build up our research group FREMO through activities within the four pillars "modern test design, statistical methods for innovative assessments, international large-scale assessments, and educational measurement" in the Norwegian context (successfully accomplished in 2019), to collaborate within the four pillars, to have a broad range of activities in each, and to establish the FREMO conference as a brand with a decent number and high quality of presentations and renowned keynote speakers (outlook to 2020-2021)

- publish with high-quality on the national and international level so that we have at least half of our publications in highly renowned journals and at least one article in a leading Q1 journal (successfully accomplished in 2019), to publish articles that have agenda-setting potential and to publish in Norwegian and Nordic outlets (outlook to 2020-2021)

- further develop the robustness of the centre and the quality of its research by expanding our portfolio of external grants (accomplished in 2019) and prepare an application for a Centre of Excellence or an individual ERC grant (outlook to 2020-2021)

- provide extensive support for our Postdoctoral fellows and PhD candidates in terms of good mentoring or supervision practices and frequent opportunities to present their work internally and externally, participation in teaching activities (successfully accomplished in 2019) and encourage PhD candidates to participate in the FREMO research seminar and several courses of the Master program (outlook to 2020-2021)

- strengthen our international network through highly-qualified Gustafsson & Skrondal scholars, establishing a new International Advisory Board (successfully accomplished in 2019), have additional guest researchers with their own funding and collaborate with international research units (outlook to 2020-2021)

Teaching 2019 – 2021

Our overall objective regarding teaching over the years 2019 to 2021 is to offer a high-quality Master of Science program in Assessment, Measurement and Evaluation and to attract a large pool of highly qualified national and international applicants. This means among other objectives to:

- further develop the selection criteria for the program and the program's profile, attract a large and qualified enough pool so that we can once more fill all study places, receive positive feedback from the first Master cohort regarding teaching quality (successfully accomplished in 2019), to have good throughput, and to clarify which resources are available in the long run to contribute to teaching beyond the Master program, namely at the bachelor level or to stakeholders and internationally (outlook to 2020-2021)

Outreach 2019 – 2021

Our overall objective regarding outreach over the years 2019 to 2021 is to become more visible in the Norwegian and the Nordic context. This means among other objectives to:

- establish a Norwegian board with representatives of the professional testing field besides the already existing scientific international Advisory board and publish a textbook or an article in a popular science outlet such as forskning.no (not yet accomplished)
- create a network in assessment, measurement and evaluation as part of the Nordic Educational Research Association (NERA) and publish at least one article each in a journal with a Nordic focus (successfully accomplished in 2019)

Administration 2019 – 2021

Our overall objective regarding CEMO as an institution over the course of the next three years is to offer our employees a stable, productive and enjoyable working environment. This means among other objectives to

- fill the fifth professor position with a highly-qualified candidate that fits well to the centre's profile, substantively and personally, give a voice to all team members and include them in decision-making processes, ensure good information flow and communication styles, have regular joint social activities that have the potential to include all team members, establish and document effective administrative routines for core processes (successfully accomplished in 2019) and establish CEMO as a level 3 center at the Faculty of Educational Sciences with secure basic funding at the current size and productive relations with ILS, IPED and ISP (outlook to 2020-2021)

5. Management & administration

The CEMO team has developed a 3-year plan with specific short-, mid- and long-term objectives for 2019 to 2021 regarding research, teaching, outreach and organization. The plan is updated regularly. In the following, we look back at our goals in 2019 and provide insight into our plans for 2020-2021.

Administrative structure

Professor Sigrid Blömeke, Director of CEMO, runs the center. In collaboration with Deputy Director Professor Rolf Vegar Olsen and under the supervision of the CEMO Board, the responsibilities include strategic decisions about CEMO's research, teaching and outreach profile, about personnel tableau, recruitment strategies and employments as well as the management of the CEMO budget. The leader team also represents CEMO at the Faculty and higher UiO levels as well as outside the university.

Senior Advisor Anne-Catherine Lehre is responsible for the daily running of CEMO. The administration also consists of Senior Executive Officer Siri Heslien and Higher Executive Officer Gunnhild Nedberg Grønlid. Operative tasks of the administration include, among other things, external communication, facilitating a good reception and stay for guests, maintenance of the websites and social media, taking minutes from board meetings, recruiting interviews, and scientific advisory board meetings, and organizing and implementing the different arrangements like courses, seminars, and workshops. CEMO's administration also functions as permanent secretariat for the CEMO Board and the International Advisory Board.

The administration at the Faculty of Educational Sciences operates employments at CEMO as well as budgeting and accounting. The Faculty of Educational Sciences also provides IT support.

The CEMO Board

The CEMO Board is an administrative body that meets three to four times per year to approve the CEMO budget, the director's progress reports about research, teaching and outreach activities at CEMO and the employments. In addition, the Board members provide feedback on CEMO's activities from an internal perspective. The Board includes the heads of the three Departments at the Faculty of Educational Sciences, an employee representative and a student representative.

The CEMO Board	
NAME	AFFILIATION
Chair: Rita E. Hvistendahl	Head of Department of Teacher Education and School Research, UiO
Ona Bøe Vie	Head of Department of Special Needs Education, UiO
Ola Erstad	Head of Department of Education, UiO
Fredrik Helland-Riise	Employee representative
Hawa Dia	Student representative

CEMO's International Scientific Advisory Board

CEMO established in 2016 an International Scientific Advisory Board to receive feedback on its research, teaching and outreach activities from renowned and highly experienced international colleagues working in similar contexts in other countries. The Board shall also promote research between CEMO and other international research centers.

The first Board served from 2016 to 2019. In the fall of 2019, a new Board started and had its first annual meeting in December. The members discussed the CEMO portfolio including general strategic issues, research and recruitment politics, the new master program, public relation work, the FREMO research group, research on the Norwegian assessment system, research innovations ahead, and external funding applications.

International Scientific Advisory Board	
NAME	AFFILIATION
Cees Glas, Professor	University of Twente, The Netherlands. Chair of the Department of Research Methodology, Measurement and Data Analysis
Stephen Sireci, Professor	University of Massachusetts Amherst, USA. Director of the Center for Educational Assessment.
Petra Stanat, Professor	Humboldt University Berlin, Germany. Head of the Department "Education and Integration"; Director of the Institute for Educational Quality Improvement (IQB) at the Humboldt University of Berlin.
Carolin Strobl, Professor	University of Zürich, Switzerland. Head of the Research unit.

6. Finances

The Norwegian Ministry of Education and Research (7.200 MNOK core-funding to CEMO) and UiO (several positions) are CEMO's main financial contributors.

Revenues and expenditures 2019

		Financial statement	Budgeted expenses
Opening balance		-14,153,197	-14,153,197
Total Opening balance		-14,153,197	-14,153,197
Funding	Core funding	-11,607,241	-11,385,000
	External income	-100,000	
	Income from sales	383	
Total funding		-11,706,858	-11,385,000
Staff expenses	Salary cost	8,595,850	9,807,342
	Salary (variable)	-315,414	
	Holiday pay, payroll tax, pension	3,729,192	4,393,803
	Salary expenses	91,317	-60,887
	Other refunds	121,984	125,784
Total staff expenses		12,222,929	14,266,042
Operating expenses	Consultancy service	26,915	0
	Rent	109,588	2,064,362
	Travel costs, courses, conference	646,448	745,275
	Other operating expenses	859,095	779,573
Total Operating expenses		1,642,046	3,589,210
Investments	Investments	152,431	100,000
Total investments		152,431	100,000
Netto contribution	Own funding (UiO)	2,282,121	2,228,493
	Overhead	-3,529,937	-3,728,032
	Salary Reimbursement	-1,302,118	-1,645,596
Total netto contribution		-2,549,934	-3,145,135
Project closing balance	Project closing balance	427,944	0
Total project closing balance		427,944	0
Total		**-13,964,639**	**-10,728,080**

Budgeted 2020

		Budget
Opening balance		-13,964,639
Total Opening balance		-13,964,639
Funding	Core funding	-14,389,910
	External income	
	Rental/sales Income	
Total funding		-14,389,910
Staff expenses	Salary cost	10,678,646
	Salary (variable)	
	Holiday pay, payroll tax, pension	4,795,686
	Salary expenses	0
	Hourly salary	129,650
Total staff expenses		15,603,982
Operating expenses	Consultancy service	0
	Rent	1,968,253
	Travel costs, courses and conference	1,148,000
	Other operating expenses	2,343,044
Total Operating expenses		5,459,297
Investments	Investments	600,000
Total investments		600,000
Net contribution from externally funded projects	Own funding (UiO)	2,207,181
	Overhead	-3,093,434
	Salary Reimbursement	-2,394,266
Total net contribution from externally funded projects		-3,280,519
Total		**-9,971,789**

7. Appendices

CEMO current team members

Name	Nationality	Position	Since
Blömeke, Sigrid	Germany	Director	Aug 2014-
Olsen, Rolf Vegar	Norway	Professor/Deputy Director	Apr 2016-
Braeken, Johan	Belgium	Professor	Feb 2014-
Scherer, Ronny	Germany	Professor	Aug 2019-
Andersson, Björn	Sweden	Associate Professor	Dec 2017-
Stefan Schauber	Germany	Associate Professor/affiliated from Faculty of Medicine	Sep 2018-
Costa, Denise Reis	Brazil	Postdoctoral Fellow	Jan 2018-
Niculescu, Alexandra C.	Rumania	Postdoctoral Fellow	Mar 2018-
Tesema, Melaku Tesfa	Ethiopia	PhD Candidate	Jan 2015-
Helland-Riise, Fredrik	Norway	PhD Candidate	Sep 2016-
Mughogho, Kondwani K.	Malawi	PhD Candidate	Nov 2016-
Van Laar, Saskia	Netherlands	PhD Candidate	Nov 2017-
Ræder, Henrik Galligani	Norway	PhD Candidate	Nov 2017-
Haakstad, Haakon T.	Norway	PhD Candidate	Nov 2017-
Veletic, Jelena	Bosnia	PhD Candidate	Aug 2018-
Ye, Wangqiong	China	PhD Candidate	Aug 2018-
Kristensen, Jarl Kleppe	Norway	PhD Candidate	Mar 2019-
Zhang, Maoxin	China	PhD Candidate	Aug 2019-
Chen, Chia-Wen	Taiwan	PhD Candidate	Mar 2019-
Helland-Riise, Fredrik	Norway	PhD Candidate	Sep 2016-
Skrondal, Anders	Norway	Professor II	Jan 2015-
Rutkowski, Leslie	USA	Professor II	Sep 2015-
Rutkowski, David	USA	Professor II	Sep 2015-
Frey, Andreas	Germany	Professor II	Sep 2016-
Lehre, Anne-Catherine WG	Norway	Senior Adviser	Jan 2013-
Heslien, Siri A. P.	Norway	Senior Executive Officer	Jan 2018-
Grønlid, Gunnhild Nedberg	Norway	Higher Executive Officer	Nov 2019-
Jørstad, Oscar Skovdahl	Norway	Research assistant	May 2019-

CEMO former team members

Name	Nationality	Position	Period
Lehre, Anette	Norway	Research assistant	Aug 2019-Des 2019
O`Neil, Caroline	USA	Research assistant	Jan 2019-Jun 2019
Feyer, Frida K.	Norway	Research assistant	Aug 2017-Jun 2019
Uehara, Dan	Australia	Research assistant	Jan 2019- Des 2019
Andresen, Øystein	Norway	Senior Executive Officer	Aug 2014-Aug 2019

CEMO Gustafsson-Skrondal visiting scholarship

Name	Nationality	Period
Steinmann, Isa	Germany	Aug 2019-(March 2020)

CEMO guest researchers

Name	Nationality	Period
Constantinidou, Evropi-Evi	Greece	June 2019-Dec 2019
Dörendahl, Jan	Luxembourg	Aug 2019-Sept 2019
Backfisch,Iris	Germany	Sept 2019

CEMO events

High Profile talk

Name	Seminar title	Date
Cheng, Ying	Detection of Inattentiveness in Questionnaire or Survey Data	17 June 2019

Brown Bag seminars

Name	Seminar title	Date
Henrik Galligani Ræder	*Off-grade usage of numeracy items: Investigating item invariance using a step-wise procedure*	17 Dec 2019
Niek Frans	*Empirical priors in computerized adaptive testing: risk and reward*	10 Dec 2019
Isa Steinmann	*Item Wording Effects in Mixed-Worded Scales: An Application of Factor-Mixture Analysis*	3 Dec 2019
Saskia Van Laar	*Decomposing the Comparative Fit Index: Effects of model characteristics on CFI performance*	19 Nov 2019
Riikka Mononen	*Tracking individual differences in numeracy development – interplay between skills, motivation and well-being*	5 Nov 2019
Haakon Thorbergsen Haakstad	*Examining the Reliability and Pass/Fail Classification Accuracy of Objective-Structured Clinical Examinations*	8 Oct 2019
Chia-Wen Chen	*Structural Equation Mixture Model for identification of Misconception with Certainty of Response Indices*	24 Sept 2019
Kondwani Kajera Mughogho	*The interaction between item parameter bias and subscore value*	10 Sept 2019
Jan Dörendahl	*Approaching the domain specificity of achievement goal orientation*	27 Aug 2019
Shaobo Jin	*A Marginal Maximum Likelihood Approach for Extended Quadratic Structural Equation Modeling*	20 Aug 2019
Henrik Galligani Ræder	*Exploring the unidimensionality of the Norwegian National Numeracy tests*	11 June 2019
Waldir Leoncio	*Using the git system to organize your research*	28 May 2019
Denise Reis Costa	*Log-file analyses: opportunities and challenges*	15 May 2019
Haakon Thorbergsen Haakstad	*Working With the Standard Beta Distribution*	16 Apr 2019
Chia-Wen Chen	*Item response theory models for multidimensional forced-choice items*	2 Apr 2019
Johan Braeken & Saskia van Laar	*Self-reported Personality of Parents and Perceived Temperament of their Infant*	19 Mar 2019
Björn Andersson	*Notes on reliability with item response theory models*	5 Mar 2019
Alexandra Niculescu	*Adapt 21, an assessment framework for adaptation in the 21st century*	19 Feb 2019
Rolf Vegar Olsen	*Oaxaca-Blinder Decompisition (OBD): An introduction and some challenges*	22 Jan 2019

Courses

UV9292: Measurement Models, Denise Reis Costa, spring 2019
The course introduced the fundamental theories and application of measurement models.

UV9293: Item Response Theory, Björn Andersson, spring 2019
The course introduced the core concepts and techniques of item response theory (IRT) which underlie current test design strategies, psychometric analyses, and evaluation of assessment instruments

UV9294: Analysis of Large-Scale Assessment Data, Andreas Frey, autumn 2019
The focus of the course was on the methodological aspects of International Large-Scale Assessments

UV9295: Program Evaluation, David Rutkowski, autumn 2019
This introductory course presented and discussed the modern field of formal program evaluation.

UV9253: Multilevel Models, Ronny Scherer, autumn 2019
The course introduced the fundamental theories and application of multilevel models.

UV9290: Data Science, Johan Braeken, autumn 2019
In this course the focus was on the core concepts and techniques that function as foundations for formulating and implementing successful data-based analysis strategies to perform evidence-based research.

UV9291: Principles of Measurement, Björn Andersson, autumn 2019
In this course the focus was on the foundational theories and concepts in measurement.

Publications and Presentations

Contributors affiliated with CEMO in bold; * = Open Access

Articles in peer-reviewed level 2 journals or level 1 journals with impact factor>1)

Liu, Yanlou; Xin, Tao; **Andersson, Bjørn** & Tian, Wei (2019). Information matrix estimation procedures for cognitive diagnostic models. *British Journal of Mathematical & Statistical Psychology*. ISSN 0007-1102. *72*(1), s 18- 37 . doi: 10.1111/bmsp.12134

Jin, Shaobo & **Andersson, Björn** (2019). A note on the accuracy of adaptive Gauss–Hermite quadrature. *Biometrika*. ISSN 0006-3444. . doi: 10.1093/biomet/asz080

Luo, Hao; **Andersson, Björn Håkan**; Tang, Jennifer & Wong, Gloria (2019). Applying Item Response Theory Analysis to the Montreal Cognitive Assessment in a Low-Education Older Population. *Assessment (Odessa, Fla.)*. ISSN 1073-1911. s 1- 13 . doi: 10.1177/1073191118821733

Blömeke, Sigrid & **Olsen, Rolf Vegar** (2019). Consistency of results regarding teacher effects across subjects, school levels, outcomes and countries. *Teaching and Teacher Education*

: An International Journal of Research and Studies. ISSN 0742-051X. 77, s 170- 182 . doi: 10.1016/j.tate.2018.09.018

Blömeke, Sigrid; Thiel, Oliver & Jenssen, Lars (2019). Before, During, and After Examination: Development of Prospective Preschool Teachers' Mathematics-Related Enjoyment and Self-Efficacy. *Scandinavian Journal of Educational Research*. ISSN 0031-3831. *63*(4), s 506- 519 . doi: 10.1080/00313831.2017.1402368 Full text in Research Archive.

Nehls, Caroline; König, Johannes; Kaiser, Gabriele & **Blömeke, Sigrid** (2019). Profiles of teachers' general pedagogical knowledge: Nature, causes and effects on beliefs and instructional quality. *ZDM: Mathematics Education*. ISSN 1863-9690. . doi: 10.1007/s11858-019-01102-3

Jenssen, Lars; Thiel, Oliver; Dunekacke, Simone & **Blömeke, Sigrid** (2019). Mathematikangst bei angehenden frühpädagogischen Fachkräften: Bedeutsam für professionelles Wissen und Wahrnehmung von mathematischen Inhalten im Kita-Alltag?. *Journal für Mathematik-Didaktik*. ISSN 0173-5322. s 1- 27 . doi: 10.1007/s13138-019-00151-1 Show summary

Trapp, Stefanie; **Blömeke, Sigrid** & Ziegler, Matthias (2019). The openness-fluid-crystallized-intelligence (OFCI) model and the environmental enrichment hypothesis. *Intelligence*. ISSN 0160-2896. *73*, s 30- 40 . doi: 10.1016/j.intell.2019.01.009

Pettersen, Andreas & **Braeken, Johan** (2019). Mathematical Competency Demands of Assessment Items: a Search for Empirical Evidence. *International Journal of Science and Mathematics Education*. ISSN 1571-0068. *17*(2), s 405- 425 . doi: 10.1007/s10763-017-9870-y Full text in Research Archive.

Paap, Muirne C. S.; Born, Sebastian & **Braeken, Johan** (2019). Measurement Efficiency for Fixed-Precision Multidimensional Computerized Adaptive Tests: Comparing Health Measurement and Educational Testing Using Example Banks. *Applied Psychological Measurement*. ISSN 0146-6216. *43*(1), s 68- 83 . doi: 10.1177/0146621618765719

Chen, Chia-Wen; Wang, Wen-Chung; Ming Ming, Chiu & Ro, Sage (2019). Item Selection and Exposure Control Methods for Computerized Adaptive Testing with Multidimensional Ranking Items. *Journal of Educational Measurement*. ISSN 0022-0655. . doi: 10.1111/jedm.12252

Born, Sebastian; Fink, Aron; Spoden, Christian & **Frey, Andreas** (2019). Evaluating Different Equating Setups in the Continuous Item Pool Calibration for Computerized Adaptive Testing. *Frontiers in Psychology*. ISSN 1664-1078. *10* . doi: 10.3389/fpsyg.2019.01277

Rose, Norman; Nagy, Gabriel; Nagengast, Benjamin; **Frey, Andreas** & Becker, Michael (2019). Modeling multiple item context effects with generalized linear mixed models. *Frontiers in Psychology*. ISSN 1664-1078. *10* . doi: 10.3389/fpsyg.2019.00248

Frey, Andreas & Hartig, Johannes (2019). Kompetenzdiagnostik, I: *Handbuch Schulpädagogik*. Waxmann Verlag. ISBN 978-3-8252-8698-9. Chapter 75. s 849 - 858

König, Christoph; Spoden, Christian & **Frey, Andreas** (2019). An optimized Bayesian hierarchical two-parameter logistic model for small-sample item calibration. *Applied Psychological Measurement*. ISSN 0146-6216. . doi: 10.1177/0146621619893786

Engelhardt, Lena; Naumann, Johannes; Goldhammer, Frank; **Frey, Andreas**; Wenzel, Franziska; Hartig, Katja & Horz, Holger (2019). Convergent Evidence for the Validity of a Performance-Based ICT Skills Test. *European Journal of Psychological Assessment*. ISSN 1015-5759. . doi: 10.1027/1015-5759/a000507

Svetina, Dubravka; **Liaw, Yuan-Ling**; **Rutkowski, Leslie** & **Rutkowski, David** (2019). Routing Strategies

and Optimizing Design for Multistage Testing in International Large-Scale Assessments. *Journal of Educational Measurement*. ISSN 0022-0655. *56*(1), s 192- 213 . doi: 10.1111/jedm.12206

Troosters, Thierry; Tabin, Nathalie; Langer, Daniel; Burtin, Chris; Chatwin, Michelle; Clini, Enrico M.; Emtner, Margareta; Gosselink, Rik; Grant, Kathleen; Inal-Ince, Deniz; Lewko, Agnieszka; Main, Eleanor; Mitchell, Sharon; **Niculescu, Alexandra**; Oberwaldner, Beatrice & Pitta, Fabio (2019). Introduction of the harmonised respiratory physiotherapy curriculum. *Breathe*. ISSN 1810-6838. *15*(2), s 110- 115 . doi: 10.1183/20734735.0124-2019

Reis Costa, Denise & Eklöf, Hanna (2019). IRT Scales for Self-reported Test-Taking Motivation of Swedish Students in International Surveys. *Springer Proceedings in Mathematics & statistics*. ISSN 2194-1017. *265*, s 53- 63 . doi: 10.1007/978-3-030-01310-3_5

Rutkowski, Leslie; Svetina, Dubravka & **Liaw, Yuan-Ling** (2019). Collapsing Categorical Variables and Measurement Invariance. *Structural Equation Modeling*. ISSN 1070-5511. . doi: 10.1080/10705511.2018.1547640 Show summary

Scherer, Ronny; Siddiq, Fazilat & Sánchez Viveros, Bárbara (2019). The Cognitive Benefits of Learning Computer Programming: A Meta-Analysis of Transfer Effects. *Journal of Educational Psychology*. ISSN 0022-0663. *111*(5), s 764- 792 . doi: 10.1037/edu0000314 Show summary

Goldhammer, Frank; **Scherer, Ronny** & Greiff, Samuel (2019). Advancements in Technology-Based Assessment: Emerging Item Formats, Test Designs, and Data Sources. *Frontiers in Psychology*. ISSN 1664-1078. . doi: 10.3389/fpsyg.2019.03047

Hautz, Wolf E.; Kämmer, Juliane E.; Hautz, Stefanie C.; Sauter, Thomas C.; Zwaan, Laura; Exadaktylos, Aristomenis; Birrenbach, Tanja; Maier, Volker; Müller, Martin & **Schauber, Stefan Kilian (**2019). Diagnostic error increases mortality and length of hospital stay in patients presenting through the emergency room. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*. ISSN 1757-7241. *27*(1), s 1- 12 . doi: 10.1186/s13049-019-0629-z

Hautz, Wolf E.; Schubert, Sebastian; **Schauber, Stefan Kilian**; Kunina-Habenicht, Olga; Hautz, Stefanie C.; Kämmer, Juliane E. & Eva, Kevin (2019). Accuracy of self monitoring: does experience, ability or case difficulty matter?. *Medical Education*. ISSN 0308-0110. *53*(7), s 735- 744 . doi: 10.1111/medu.13801

Gin, Brian; Sim, Nicholas; **Skrondal, Anders** & Rabe-Hesketh, Sophia (2019). A Dyadic IRT Model. *arXiv.org*. ISSN 2331-8422.

Zachrisson, Henrik Daae; Janson, Harald & Lamer, Kari (2019). The Lamer Social Competence in Preschool (LSCIP) Scale: Structural Validity in a Large Norwegian Community Sample. *Scandinavian Journal of Educational Research*. ISSN 0031-3831. *63*(4), s 551- 565 . doi: 10.1080/00313831.2017.1415963

Conference contributions

Andersson, B., (2019, April) Estimation of multidimensional item response theory models using higher-order asymptotic expansions, National Council on Measurement in Education Annual Meeting, Toronto, Canada.

Blömeke, S., (2019, January) Eksamen i fagfornyelsen. KDs referansegruppemøte med partene for fagfornyelsen. Oslo, Norway.

Blömeke, S., (2019, June) Forslag til endringer i eksamensordningen pga. fagfornyelsen og den teknologiske utviklingen KDs referansegruppemøte med partene for fagfornyelsen. Oslo, Norway.

Blömeke, S., (2019, June) Teacher competence and instructional quality – conceptualization and empirical relation QUINT conference. Oslo, Norway.

Blömeke, S., (2019, September) Teacher Competence and Instructional Quality: Conceptualization, Assessment and Results OCCAM conference. Gothenburg, Sweden,

Blömeke, S., (2019, October) Comment on "Assessment Paradigms" by Jo-Anne Baird University of Bergen. Bergen, Norway.

Blömeke, S., (2019, October) Exams in Norway: Main features and the need of a quality assurance framework International workshop Udir. Oslo, Norway.

Blömeke, S., (2019, October) Ny eksamensordning etter fagfornyelsen. Skolenes landsforbund landsstyremøte. Sørmarka, Norway.

Frey, A., Fink, A., Born, S., & Spoden, C. (2019, February). *Computerisiertes adaptives Testen bei wiederkehrenden Erhebungen mit kleinen Stichproben* [Computerized adaptive testing for recurring tests with small samples]. Paper presented at the 7. Tagung der Gesellschaft für Empirische Bildungsforschung (GEBF), Köln, Germany.

Frey, A. (2019, March). *Hochschulklausuren besser machen: Das Projekt KAT-HS* [Making written University exams better: The project KAT-HS]. Paper presented at the Kolloquium Methoden der empirischen Bildungsforschung, Hirschegg, Austria.

Frey, A., Fink, A., & Spoden, C. (2019, June). *Consideration of item position effects in CAT with the continuous calibration strategy*. Paper presented at the Conference of the International Association for Computerized Adaptive Testing (IACAT), Minneapolis, USA.

Frey,A., Fink, A., & Spoden, C. (2019, September). *Berücksichtigung von Itempositionseffekten beim computerisierten adaptiven Testen mit der kontinuierlichen Kalibrierungsstrategie* [Consideration of itemposition effects in computerized adaptive testing with the continuous calibration strategy]. Paper presented at the 14. Tagung der Fachgruppe Methoden und Evaluation der Deutschen Gesellschaft für Psychologie (DGPs), Kiel, Germany.

Frey, A., & Hartig, J. (2019, September). *Methodenentwicklungen zu Anwendungen der Item-Response-Theorie in verschiedenen diagnostischen Kontexten* [New methods for applications of item-response theory in different diagnostic contexts]. Symposium organized at the 14. Tagung der Fachgruppe Methoden und Evaluation der Deutschen Gesellschaft für Psychologie (DGPs), Kiel, Germany.

Frey, A., Fink, A., & Spoden, C. (2019, October). *Kriteriumsorientiertes adaptives Testen an der Hochschule (KAT-HS)* [Criterion-referenced adaptive testing in higher education]. Poster presented at the Conference of the Hochschulforum Digitalisierung (HFDcon), Bonn, Germany.

Kroll, P., Born, S., & **Frey, A.** (2019, September). *Itemparameter-Drift in kleinen Stichproben* [Itemparameter drift in small samples]. Paper presented at the 14. Tagung der Fachgruppe Methoden und Evaluation der Deutschen Gesellschaft für Psychologie (DGPs), Kiel, Germany.

Spoden, C., & **Frey, A.** (2019, September). Adaptive, partiell-adaptive und multistage Messung individueller Veränderung [Adaptive, partially-adaptive and multistage testing of individual change]. Paper presented at the 14. Tagung der Fachgruppe Methoden und Evaluation der Deutschen Gesellschaft für Psychologie (DGPs), Kiel, Germany.

Engelhardt, L., Naumann, J., Goldhammer, F., **Frey, A.**, Horz, H., Hartig, K., & Wenzel, S. F. C. (2019, September). *Performance-based testing of ICT skills. Development and evaluation of an ICT skills framework*. Paper presented at the conference of the research initiative Positive Learning in the Age of Information (PLATO), Mainz, Germany.

Fink, A., Spoden, C., Born, S., & **Frey, A.** (2019, August). *Testing an explanatory model for the intention to use e-exams by the university teaching staff*. Paper presented at the 18th Biennial EARLI Conference for Research on Learning and Instruction (EARLI), Aachen, Germany.

Koenig, C., Khorramdel, L, Yamamoto, K., & **Frey, A.** (2019, August). *Increasing the flexibility of large-scale assessments with fixed item parameter calibration*. Paper presented at the 18th Biennial EARLI Conference for Research on Learning and Instruction (EARLI), Aachen, Germany.

Born, S., Spoden, C., Fink, A., & **Frey, A.** (2019, February). *Psychometrische Optimierungen bei kontinuierlich kalibrierten Hochschulklausuren* [Psychometric optimization of continuously calibrated university exams]. Paper presented at the 7. Tagung der Gesellschaft für Empirische Bildungsforschung (GEBF), Köln, Germany.

Esmaeili Bijarsari, S., **Frey, A.**, Spoden, C., Born, S., & Fink, A. (2019, February). *Emotionale Effekte von Itemreview in Hochschulklausuren* [Emotional effects of item review in written university exams]. Paper presented at the 7. Tagung der Gesellschaft für Empirische Bildungsforschung (GEBF), Köln, Germany.

Fink, A., Spoden, C., Born, S., & **Frey, A.** (2019, August). *Testing an explanatory model for the intention to use e-exams by the university teaching staff* [Factors influencing the intention of university teachers to use (adaptive) e-exams]. Paper presented at the 18th Biennial EARLI Conference for Research on Learning and Instruction (EARLI), Aachen, Germany.

Reis Costa, D., (2019, July) Application of Kaplan-Meier Curves for Analysis of Process Data-Symposium Process data in international large-scale assessments: Methods and applications. Presentation at the International Meeting of the Psychometric Society (IMPS), Santiago, Chile.

Steinmann, I., (2019, September). Achievement Effects of Extracurricular Homework Support and Remedial Education for Non-Native Speakers in Germany. Presentation at the WERA-IRN Extended Education Conference, Stockholm, Sweden.

Strello, A., Strietholt, R., Siepmann, C., & **Steinmann, I**. (2019, June). Effects of Early Tracking on Performance and Inequalities in Achievement: Combined Evidence from PIRLS, TIMSS, and PISA. Presentation at the IEA International Research Conference (IEA IRC), Copenhagen, Denmark.

Steinmann, I., Strietholt, R., & Rosén, M. (2019, April). International Reading Gaps between Boys and Girls from 1970-2011. Presentation at the American Educational Research Association (AERA) Annual Meeting, Toronto, Canada.

Gustafsson, J.-E., Rosén, M., **Steinmann, I.** & Strietholt, R. (2019, August). Outcomes and Their Determinants in International Comparative Assessments Part I. Symposium at the European Conference on Educational Research (ECER), Hamburg, Germany.

Gustafsson, J.-E., Rosén, M., **Steinmann, I.** & Strietholt, R. (2019, August). Outcomes and Their Determinants in International Comparative Assessments Part II. Symposium at the European Conference on Educational Research (ECER), Hamburg, Germany.

Gustafsson, J.-E., Rosén, M., **Steinmann, I.** & Strietholt, R. (2019, August). Outcomes and Their Determinants in International Comparative Assessments Part III. Symposium at the European Conference on Educational Research (ECER), Hamburg, Germany.

Veletić, J., & **Olsen, R.V.** (2019, September). Instructional Leadership as a predictor of Teacher Job Satisfaction. Presentation at the European Conference on Educational Research (ECER), Hamburg, Germany.

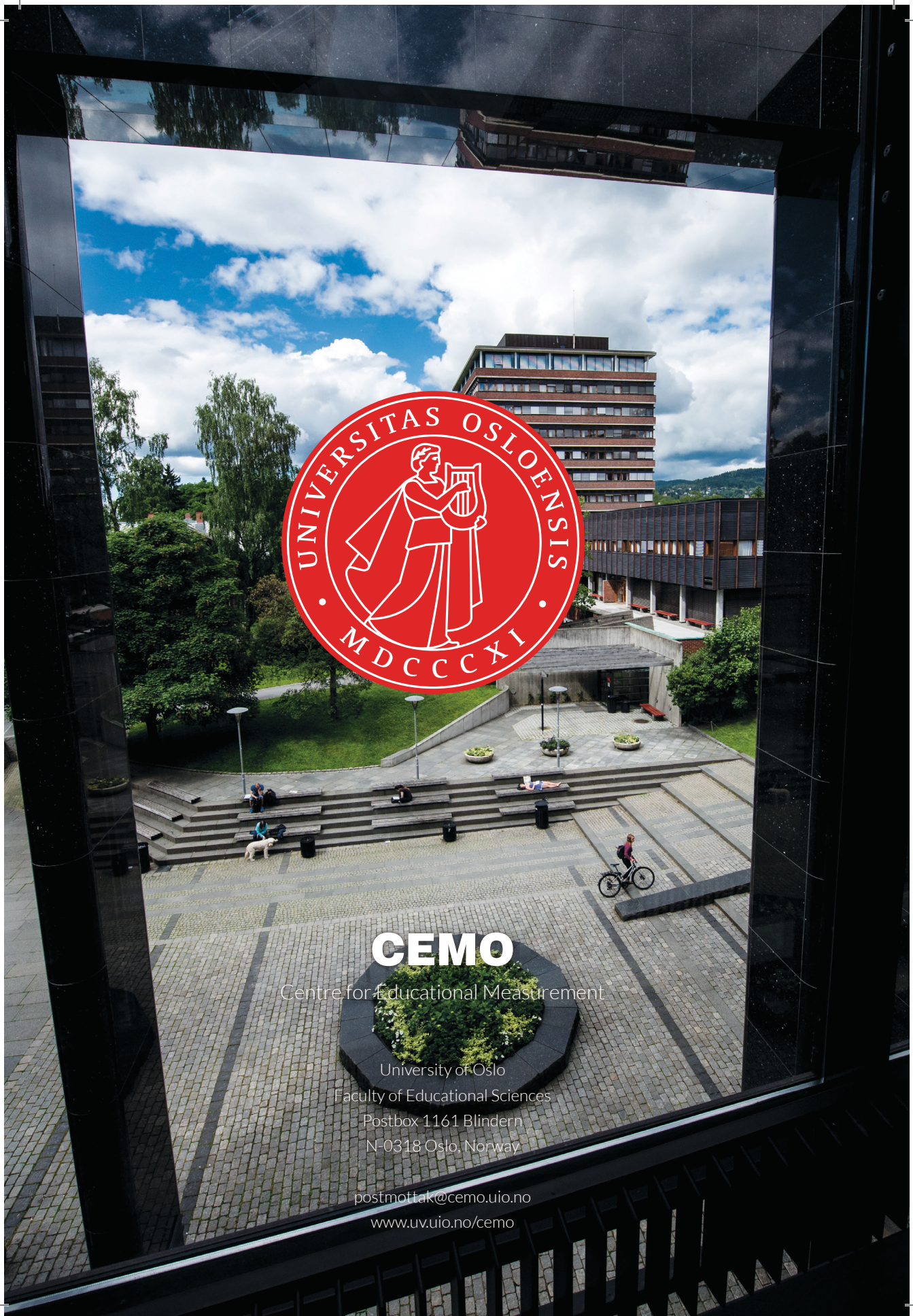
Awards

CEMO director **Sigrid Blömeke** received the University of Oslo's Research Award 2019.

Gustafsson-Skrondal visiting scholar **Isa Steinmann** received Technical University of Dortmund's Rudolf Chaudoire Awars 2019.

CEMO PhD candidates **Kondwani Kajera Mughogho** and **Stephan Daus** won the best poster awards at the IEA International Research Conference in Copenhagen.

Stephan Daus received in addition the IEA Bruce H. Choppin Memorial Award for an 'outstanding PhD research thesis based on IEA study data'.



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