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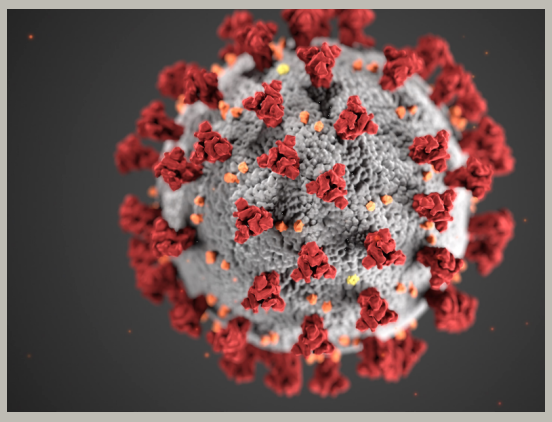
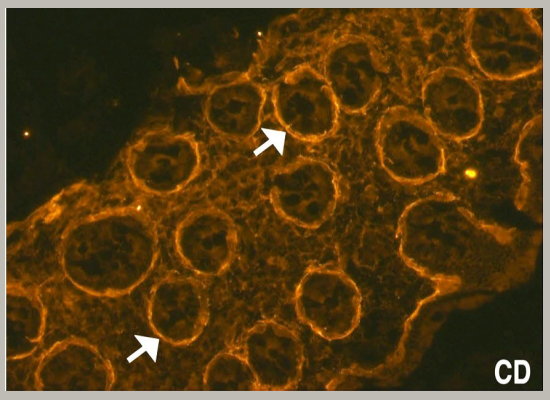




IN THIS ISSUE

NEW RESEARCH GRANTS AWARDED BY THE MINISTRY OF EDUCATION AND SCIENCE OF THE REPUBLIC OF KAZAKHSTAN

We are pleased to announce that NU researchers have won in total 13 grants supported by the Ministry of Education and Science: 10 grants under the Grant Funding programme 2021-2023 and 3 grants within the Young Researchers Framework. All projects have a three-year duration and will start their implementation this year. Below is the list of projects:

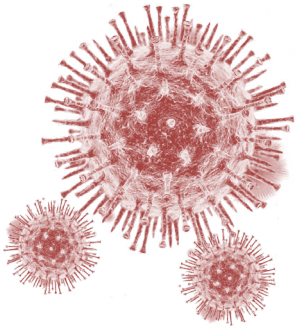
GRANT FUNDING PROGRAMME 2021-2023

№	Principal Investigator	School	Title
1	Darkhan Bilyalov	GSE	Per-capita funding model in Kazakhstani public and private schools and issues of adequacy, equity and accountability
2	Askar Boranbayev	SEDS	Development of intellectual information technology to support decision-making to ensure the economic stability of Kazakhstan under pandemics
3	Boris Golman	SEDS	Development of centrifugal additive manufacturing technologies for fabrication of fine powder composites.
4	Lee Woojin	SEDS	Development of novel nano-composites (Nano-zero Valent Iron, NZVI) supported by porous materials for the enhanced removal of aqueous mercury.
5	Arbuz Alexandr Sergeevich	Office of the Provost	Development and research of technology for obtaining and advance refinement of oxide dispersion-strengthened steel for use in nuclear engineering
6	Dichuan Zhang	SEDS	Multi-layered inertial reactive armour
7	Aishuak Konarov	SEDS	Utilization of the biowaste-derived carbon and enhancement of its electrochemical performance via doping
8	Gaipov Abduzhappar	NUSOM	Epidemiology and Forecasting of Infectious Diseases in Kazakhstan Using Big Healthcare Data, Mathematical Modeling and Machine Learning
9	Nuraje Nurxat	SEDS	Multifunctional Desulfurization Polymer Nanocomposites
10	Durvudkhan Suragan	SSH	Subelliptic functional inequalities

YOUNG RESEARCHERS PROGRAMME 2021-2023

№	Principal Investigator	School	Title
11	Kulsharova Gulsim	SEDS	Sensor Integrated Microfluidic Platform for Studying the Effects of Toxicological Compounds on the Human Respiratory System
12	Kappassov Zhanat	SEDS	Event-based Robot Skin for Intelligent Robot-Environment Physical Interaction
13	Durvudkhan Suragan	SSH	Remainder term analysis for Hardy type inequalities

We congratulate all the winners and wish them fruitful work and success!



NU Responses to Covid-19

RECENT PUBLICATIONS ON COVID-19

MAXIMAL INTERACTION OF ELECTROMAGNETIC RADIATION WITH CORONA VIRIONS

Authors: Constantinos Valagiannopoulos[1] and Ari Sihvola[2]

[1]School of Sciences and Humanities, Nazarbayev University, KZ-010000, Kazakhstan
[2]School of Electrical Engineering, Aalto University, FI-00076, Finland

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Absorption and scattering of the impinging electromagnetic waves are the two fundamental operations describing the energy exchange of any organic or inorganic particle with its environment. In the case of virion cells, substantial extinction power (counting both absorbing and scattering effects) is a prerequisite for performing a variety of coupling actions against the viral particles, and thus is a highly sought-after feature. By considering realistic dispersion for the dielectric permittivity of proteins and a core-shell modeling allowing for rigorous formulation via Mie theory, we report optical extinction resonances for corona virions at mid-infrared range that are not significantly perturbed by changes in the object's size or the background host. Our findings indicate the optimal regime for interaction of photonic radiation with viral particles, and may assist towards the development of equipment for thermal damage, disintegration, or neutralization of coronavirus cells.

NEUTROPHIL ELASTASE AND PROTEINASE 3 CLEAVAGE SITES ARE ADJACENT OF THE POLYBASIC SEQUENCE WITHIN THE PROTEOLYTIC SENSITIVE ACTIVATION LOOP OF THE SARS-COV-2 SPIKE PROTEIN

Authors: Zhadyra Mustafa[1], Anuar Zhanapiya[1], Hubert Kalbacher[2], and Timo Burster[1]

[1]Department of Biology, School of Sciences and Humanities, Nazarbayev University, Kabanbay Batyr Ave., 53, Nur-Sultan, 010000, Kazakhstan Republic
[2]Eberhard Karls University Tübingen, Faculty of Medicine, Institute of Clinical Anatomy and Cell Analysis, Österbergstraße 3, 72074 Tübingen, Germany

The serine proteases neutrophil elastase (NE), protease 3 (PR3), cathepsin G (CatG), and neutrophil serine protease 4 (NSP4) are released by activated neutrophils swarming around the place of pathogen invasion to provoke an immune response. However, uncontrolled proteolytic activity of proteases results in various human diseases, including cardiovascular diseases, thrombosis, and autoimmunity. In addition, proteases can be hijacked by several viruses in order to prime virus-derived surface proteins and evade immune detection by entering into the host cell. Indeed, porcine elastase increases the suitability of host cells to be infected by SARS-CoV-1. We compared the cleavage sites of human NE, PR3, and CatG as well as porcine-derived trypsin within the amino acid sequence of the proteolytic sensitive activation loop at the interface of S1/S2 of the spike protein (S protein) of SARS-CoV-1 as well as SARS-CoV-2. As a result, NE and PR3, but not CatG, hydrolyze the scissile peptide bond adjacent to the polybasic amino acid sequence of the S1/S2 interface of SARS-CoV-2, which is distinctive from SARS-CoV-1. These findings suggest that neutrophil-derived NE and PR3 participate in priming of the S1/S2 interface during an immune response.

THE COVID-19 PANDEMIC CONFERENCE WEBINAR

Sponsored by: Routledge publishers, the International Sociological Association, and Nazarbayev University

Organized by: Dr. J. Michael Ryan

April 19th, 20th, 21st, 2021

How to access:

Conference webpage (including full program and registration)

Zoom link ((Meeting ID: 919 6891 0883 / Passcode: 968382)

The "COVID-19 Pandemic Conference Webinar" will examine the impact of the COVID-19 pandemic on individuals, communities, countries, and the larger global society from a social scientific perspective. This conference webinar will include 12 sessions highlighting the work of more than 40 leading scholars from across 5 continents. Keynote addresses include the following:

COVID-19 and the other half of the story: the social (Monday, April 19th @ 18h GMT)
William Cockerham,
Distinguished Professor and Chair Emeritus of Sociology at the University of Alabama at Birmingham and Research Scholar of Sociology at the College of William & Mary

COVID-19 and the law: surveillance and inequality (Tuesday, April 20th @ 18h GMT)
I .Glenn Cohen,
Deputy Dean and James A. Attwood and Leslie Williams Professor of Law, Harvard Law School and Faculty Director, Petrie-Flom Center for Health Law Policy, Biotechnology & Bioethics

Toward post-COVID-19 sociology (Wednesday, April 21st @ 18h GMT)
Sari Hanafi,
President, International Sociological Association; Professor of Sociology, A/Director of Center for Arab and Middle Eastern Studies and Chair of the Islamic Studies program at the American University of Beirut

Dr. Funda Guven

EMERGENCY REMOTE TEACHING TO HYBRID/ FLEXIBLE TEACHING MODEL

«I found that digital access, digital commerce, digital communication, digital literacy, digital etiquette not as problematic as the categories of digital law (regulations at university level), digital rights and responsibilities for each party, digital health and wellness, as well as digital security...»

INTRODUCTION

COVID-19 pandemic has ushered us to a digital age while fundamentally changing our lives. The ongoing paradigm has shifted in higher education during COVID-19, proving to be a transition to a student-centered approach in which learning outcomes play the central role while being a part of a digital community is inescapable. The role of faculty has shifted away from being an instructor as the center of attention to be a mentor, encouraging students to take more responsibility for their learning and to provide resources while they motivate them to learn. When the pandemic arrived, most of the faculty, students, and staff were not ready to move into the online teaching/ learning environment. However, there is no other option for all of us.

Nazarbayev University underwent strict measures after the first case was detected in Kazakhstan on March 13 in 2020. University administration immediately took action to protect the NU community after the announcement by the government. The policy "work-from-home" began on March 16 when the number of the cases rose to 111, of which more than half was in Nur-Sultan city. Students were notified to leave the campus before the quarantine started on March 19 when the in-person classes stopped, and faculty asked not to go to the campus. Almost all students were sent to their homes before the city underwent quarantine on March 20. An online platform Zoom, was introduced to the entire faculty by the university administration as an easily accessible software program. Further to that, the government announced a strict lockdown on March 28 and restricted all movements in the city.

WORK FROM HOME

Faculty and students were given extra time to adjust themselves to the new norm. All faculty and staff were reassigned to work from home. The president of the university sent a guide on how to work from home to all faculty and staff in the e-mail, letter #7, extending spring break for students until April 5. Working from home became the norm on April 6. All faculty members were notified to check in their classes and clarify any technological or other issues. Faculty worked with the Vice Dean for Academic Affairs to move their courses and assessments online, suggesting open book exams. Typical assessments were recommended, such as case studies, group-based interviews, essays, and research papers instead of summative assessments.

The faculty of the Department was asked to revisit their syllabi for online teaching and include relevant assessments. According to the survey held by the Institutional Research and Analytics Office Of The Provost, 45% of the instructors adopted their syllabi, and 32 % of them included engaging teaching methods in all/ most of the courses.

EMERGENCY REMOTE TEACHING (ERT)

The situation that all faculty and students experienced due to the COVID-19 pandemic in March 2020 is not online teaching. It is called emergency remote teaching, which refers to "pandemic pedagogy" that all faculty and students were forced to work or study under the stay-at-home order. Transferring from a classroom setting to emergency teaching on the Internet platforms changed the definition of online teaching. Before the COVID-19 pandemic, online teaching was a marginal teaching method based on none or restricted face-to-face mode. However, during the COVID-19 pandemic and mandatory online teaching period, synchronous mode was widely used until university administration warned faculty that students might not access the

Internet all the times.

Why do we separate online teaching from Emergency Remote Teaching during the COVID 19? First of all, faculty used Internet platforms and tools to deliver their lectures. The pedagogy has not changed but only the way of delivery. Online teaching is special teaching with its conventions from designing content, delivering it, creating assignments and assessments, and using technology effectively. It does not mean that you are teaching online when you only sit in front of a camera and deliver your asynchronous or synchronous lessons.

TRANSFERRING TO ERT AT NU

NU underwent three phases when the COVID-19 pandemic reached in Kazakhstan.

Phase 1: Emergency Remote Teaching period from April 5, 2020, to the end of the semester was to finish the semester and provide students' grades for their graduation.

Phase 2: Summer classes were online from beginning to end. Instructors shared their experiences with us. Department of KazLT organized workshops during summer 2020 to deliver their courses and use classroom management systems and platforms. The first issue we highlighted how to engage students during the ERT period. The modes of communication helped us to design our courses.

Phase 3: Fall 2020 and Spring 2020: All classes were delivered online. The Department of KazLT adopted a temporary policy teaching two sections of each course in order to support faculty and give them enough time to prepare their courses in online settings. Unfortunately, adaptation for ERT is completed but not for online teaching and learning. The transition period has not over yet since the faculty settled in ERT.

LEARNING OUTCOMES AND WORKLOAD

I have been working on learning outcomes for all programs and subprograms in the department since 2018. The executive committee approved a framework in April 2020. We discussed to include learning outcomes in the syllabi. We also discussed the workload of students. We recount the workload based on Bologna Report disclosed in 2018 and corresponded to the Associate Dean of Academic Affairs. Each student must spend **12 hours a week for per course** during the semester according to the ECTS credit requirements. Then, we decided to ask students 9 hours of active work per week for each 3 credits course and give them 3 hours to explore the subjects by themselves and do research. This workload did not add extra work on our faculty, as you will see in the survey results. Whereas 86% of the students indicated that they had a heavier workload (Results from the Adaptation to Remote Learning NU). According to NU's Adaptation to Remote Learning survey results, " Students spent around 20 hours per week preparing for class and little over 9 hours per week attending virtual (live) classes which do NOT match with the requirements of Bologna.

DIGITAL LITERACY /CITIZENSHIP

The Department of Kazakh Language and Turkic Studies (KazLT) included "digital literacy" among other department goals to prepare students to compete on technological literacy and digital technologies in April 2020. We interpreted digital literacy as using Internet technologies and applying them to respective subject matters to lead students who also use the Internet in their daily lives. One of the goals is to prepare students to manage how to be digital citizens. The department aimed to usher the students in the digital world as genuine digital citizens (Mossberger, 2008), which is needed to be elaborated more in each program's and course's goals besides acquiring digital literacy.

With the teach-from-home order, both faculty and students had found themselves as appointed digital citizens since they did not have a choice to teach or learn in a conventional face-to-face or in-person platform. Digital citizenship is more than acting online or using technology but a broader term and "heuristic concept" contributing to social relations and practices (Couldry, 2014). Citizens of the digital world are not only doing internet technologies as instruments but also reconstitute themselves and create a cultural environment as the result of interactions that they engage in. They bring their old experiences and their anticipations on the online platforms (Choi Moon-son, 2016). Digital citizenship is different from imagined communities (Anderson 1983). Users are expected to divide their official usage and their social interactions and behave appropriately. We will not discuss social media usage in detail,

but will consider online platforms that faculty use during online education, which university administration made mandatory.

Like conventional citizenship, digital citizenship is constituted around rights and responsibilities in the digital world (Ribble, 2017, p.7). Ribble claims that there is tension between teachers and students who see each other as more competent on technologies. He argues that students are considered the natives of the digital world, whereas teachers are immigrants since they enter this world later. He defined elements that are the basis of technology use and formulated the foundation on which digital society constituted. He categorized nine elements of digital citizenship that interest teachers mainly. Those are digital access, digital commerce, digital communication, digital literacy, digital etiquette, digital law, digital right and responsibilities, digital health and wellness, as well as digital security (Ribble, 2017, p. 16). The concept of digital citizenship underlines the positive aspect of technology to work and play in the digital world.

One of the positive aspects of COVID-19 is that teachers and students have become digital citizens who are also a part of global digital society quickly. However, they faced different challenges such as inaccessibility to the resources and poor digital skills. Serious questions arose about the roles of teachers, required online tools, and assessment during the COVID-19 pandemic. It is still a question of how education professionals would respond to their learners' needs while they are also, under the phycological impact of the pandemic. Our research seeks to find common ground between faculty and students of the Department of KazLT when it shows how ready the faculty is for the digital citizenry.

METHODOLOGY

We used both qualitative and quantitative research methods, surveys, and syllabi analysis. We distributed online surveys to the participant's emails. Those surveys aimed only at the faculty of the Department of KazLT and the students. They are enrolled in courses at the Department of KazLT since the ultimate goal of the research to come up with a framework to teach Kazakh and Turkic languages online. The other part of the study is to get data from administrators and parents.

We gave a questionnaire to the faculty at the end of Fall 2020 when NU finished completed full emergency remote teaching. The questionnaire with 70 questions was prepared in English, Kazakh, and Russian and delivered to 23 faculty members by Qualtrics. 21 faculty members whose teaching experience ranged from 4 to 24 years responded to the survey. All results are unanimously collected. We analyzed data based on the concept "digital citizenship' to see how faculty is ready and comfortable. Another survey with 47 questions was given to the 600 students who enrolled in classes at the Department of KazLT. 118 students took the survey, 99 students completed it. We used content analysis of syllabi as qualitive method. As a part of content analysis approach, 10 randomly chosen syllabi were collected and in order to understand how faculty adjusted their syllabi from traditional teaching to online teaching.

Our research question is how faculty/students experienced ERT or L during the COVID-19 pandemic. Results revealed that the faculty's experience with using technology was enough to fulfill a smooth transition to ERT. During the stay-at-home teaching period, the faculty overall took care of their well-being. However, we found that a few faculties did not have all technological tools to teach online. Our findings show that most of the faculty maintained ERT successfully. The situation for the students is different. We aimed to gather information about their living conditions.

OUR FINDINGS

50% of the faculty is not ready to be a digital citizen yet. Students are incomplete digital citizens or not mature enough on online platforms since the borders are elastic and rules are not transparent yet. We do not know that whether they will live in this ambiguous digital environment forever. However, the university must decide its own citizens' (who are faculty, staff, and students) digital rights and responsibilities in the near future. We need more discussions how to deal with this new normal in our daily professional lives. In the categorization of Ribble, I found that digital access, digital commerce, digital communication, digital literacy, digital etiquette

not as problematic as the categories of **digital law (regulations at university level), digital rights and responsibilities for each party, digital health and wellness, as well as digital security**. Those areas need to be addressed to protect all faculty, staff, and students.

Our results showed us that students somehow manage their study, though a few of them had technological difficulties or difficult life conditions. 95% of the students are being distracted by their family members and having a hard time coping with their parents though NU survey show 33% of the students are distracted by ongoing family issues.

Students show that they interact with others. Only 8% of the respondents do not interact with their friends. 34% of the respondents started a new friendship in fall 2020. 37% of the respondent interact with their friends more than one hour in a day. 70% of the respondents also participated in group projects which is so much higher than NU results showing 59% there is no interaction with the other students. 36.4% of respondents participate in club activities as opposed to 17.5 % participation in extracurricular activities at the NU survey.

48% of respondents do not share their computers with the others, while 17% of the NU survey respondents share their devices.

Well-being: 82% of our student respondents do not do any sports. They spend their leisure time surfing on the Internet (23%), or social media (22%), listening to music (22%) or reading books (11%). [According to their answers to open-ended questions, their families complain about them spending time in front of the screen.

SUGGESTIONS

1. Being ready for any kind of unexpected lockdown: We suggest hybrid/blended model for the schools and for the courses. Schools can keep some of the courses online during the semester. Those online courses will give opportunity and flexibility to students after they go back to face-to-face education. As for, the course level, faculty can design some online modules to give students to a flexibility to study by themselves and do their assignments.
2. Faculty and students also do not feel that they are a member of digital community. NU administrators should work on how to create a digital community at NU. Digital rights and responsibilities, security of their work as well as health and wellness should be priority for faculty and student's body. We need to focus on body and mind detachment in digital world and develop it.
3. Syllabi needs to show how to entail learning outcomes to each lesson and each activity. Assessments should measure learning outcomes if students reached them by the end of each lesson and the course. Faculty needs to spend time to analyze assessment results and student's feedback.
4. Three modes of communication should be addressed in the course. Those are the interpretive mode that students reading and viewing or listen to materials, the interpersonal mode that students interact with the faculty and peers or other relevant people and prove it and the presentational mode that students present their work in a written or recorded form.
5. Students workload must be revisited. Courses should be designed to engage students in for 12 hours/ 3 credits courses.

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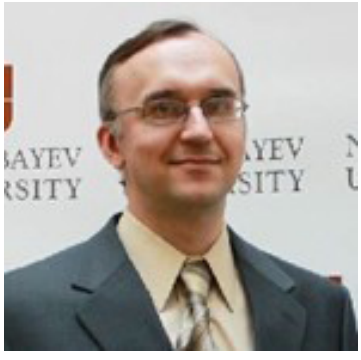
School of Sciences and Humanities News

DR. BIMAL ADHIKARI EXPLORES THE EFFECT OF THE UNITED NATIONS HUMAN RIGHTS SHAMING ON FOREIGN POLICY OF ADVANCED DEMOCRACIES

In an article "UN Human Rights Shaming and Foreign Aid Allocation" published in *Human Rights Review* (2021), Dr. Bimal Adhikari, Assistant Professor in the Department of Political Science and International Relations, argues that countries shamed in the United Nations Human Rights Council encourage donor states to channel more aid via international and local non-governmental organizations. He finds this effect to be more pronounced with increased media coverage. This suggests that international organizations do influence advanced democracies' foreign policy. Moreover, he also finds that donor governments do not punish recipient leaders by scaling back on government-to-government aid, which is more fungible, despite public condemnations of their human rights practices owing largely to strategic concerns.

POLITICAL SCIENCE PROFESSORS EXPLORE THE POLITICS OF REFORM IN KAZAKHSTAN

Dr. Jean-Francois Caron, Associate Professor in the Department of Political Science and International Relations, has edited a book *Understanding Kazakhstan's 2019 Political Transition* (Palgrave Macmillan, 2021). The authors analyze the political aspects of Kazakhstani President Nursultan Nazarbayev's resignation in March 2019. More specifically, they try to understand its political significance for the country's policies, the prospects of democratization, the uniqueness of the transition compared with others that have previously occurred in the region, and how it may play an influential part in future political transitions in this part of the world. The book can be found here.



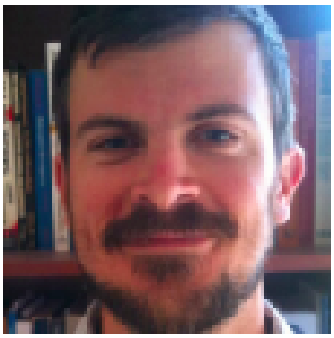
Dr. Alexei Trochev, Associate Professor in the Department of Political Science and International Relations, has co-authored with Dr. Gavin Slade (Sociology and Anthropology Department at the SSH) and Malika Talgatova (PhD Candidate at the University of California at San Diego), an article "The Limits of Authoritarian Modernisation: Zero Tolerance Policing in Kazakhstan" in *Europe-Asia Studies* (2021). The authors study police inertia and the depth of public mistrust in, and apathy towards, zero tolerance policing (ZTP) in Kazakhstan. Using survey, social media and official data they show how ZTP failed: politicians did not summon any political will for the policy, the police subverted any attempted reforms, while citizens ignored them.

The failure of ZTP delineates the limits of authoritarian modernisation. They argue that modernisers require assistance from citizens in reforming police yet cannot mobilise such assistance due to public distrust which itself is created by authoritarian modernisers' preference for police loyalty over police good behaviour. The consequence is a decoupling of the rhetoric from the reality of police reform.

DR. CARESS SCHENK REVIEWS EXISTING RESEARCH ON POPULISM, SECURITIZATION, BIOPOLITICS, AND OTHER CRITICAL SCHOLARSHIP RELATED TO THE ISSUE OF OTHERING MIGRANTS

Dr. Caress Schenk, Associate Professor in the Department of Political Science and International Relations, has published an article "The Migrant Other: Exclusion without Nationalism?" in *Nationalities Papers* (2021). Dr. Schenk argues that migrants are an easy, visible Other, seeming to fall neatly into the us-versus-them framework of nationalism. Nevertheless, much of the scholarly approach to migrant identity, with the partial exception of a largely separate literature on citizenship, has eschewed overt ties to nationalism studies. When us-versus-them language is used in relation to nationalism, the focus or nodal point is the identity of the seemingly homogenous "us" of the nation. However, when migrants are othered, the focus is not always the nation, and while othering migrants always creates exclusion, it is not always exclusion from a nation or identity group. Dr. Schenk shows that different sets of "us" are set against migrants, some of which evoke identity and others of which do not, elucidating the links (or the lack thereof) of each approach to the study of nationalism. In each of these frameworks, the migrant Other comes up against a different frame of reference, leaving migrants themselves (or any sense of migrant identity) somewhat lost amid the analytical frameworks, at continual risk of being re-othered as victims of circumstance without agency.

DR. BRIAN SMITH EXPLORES NOVEL ASPECTS OF PHILOSOPHY OF JOHN LOCKE



Dr. Brian Smith, Assistant Professor in the Department of Political Science and International Relations, has published a book John Locke, Territory, and Transmigration (Routledge, 2021). In his book, Dr. Smith examines John Locke as a theorist of migration, immigration, and the movement of peoples. By outlining the contours of the public discourse surrounding migration in the seventeenth century and situating Locke's in-depth involvement in these debates, Dr. Smith presents a variety of undercurrents in Locke's writing — his ideas on populationism, naturalization, colonization and the right to withdrawal, the plight of refugees, and territorial rights — which have great import in present-day debates about migration. Departing from the popular extant literature that sees Locke advocating for a strong right to exclude foreigners, the author proposes a Lockean theory of immigration that recognizes the fundamental right to emigrate, thus catering to an age wrought with terrorism, xenophobia and economic inequality. A unique and compelling contribution, this book will be of great interest to scholars and researchers of political theory, political philosophy, history of international politics, international relations, international political economy, public policy, seventeenth century English history, migration and citizenship studies, and moral philosophy.

Dr. Smith has also published an article "John Locke and Samuel Rutherford on the distance between paternal care and fiduciary trust" in *The Seventeenth Century* (2021), in which he links Locke's use of "fiduciary trust" to the early seventeenth century debates about the limits of Charles I's sovereignty. Specifically, Dr. Smith points to a striking congruence between Locke and Samuel Rutherford's *Lex Rex* (1644). Anticipating similar formulations in the Second Treatise, Rutherford argues that unlike domestic relationships, which are governed by natural paternal affections (care),

sovereign authority is unnatural and artificial. In stark contrast to prominent royalist positions of that day, Rutherford argues that fathers do not have the right to kill their sons and wives, specifically linking the source and limit of their authority to natural love and affection. This distinction sharply distinguishes paternal authority from fiduciary trust. The former is governed by the natural law and is derived from the implicit or psychic trust that emerges between those in loving relationships; the latter is a product of positive law and is built on a presumption of distrust. Locke builds on these arguments, particularly with regard to conjugal society. While co-parents will typically be bound together by care and affection, the risk of the husband's neglect or overreach required that formal trust-mechanisms be put in place to assure the rights of the child (and wife) were not infringed. Like paternal authority, Locke's conjugal society is another example of why political authority cannot be predicated on care.

DR. CHARLES SULLIVAN EXPLORES SCENARIOS OF HIGH-LEVEL POLITICAL CHANGE IN AFGHANISTAN AND THE KYRGYZ REPUBLIC

In an article "White Flags: On the Return of the Afghan Taliban and the Fate of Afghanistan" in *Asian Affairs* (2021), Dr. Charles Sullivan, Assistant Professor in the Department of Political Science and International Relations, in which he argues that the Afghan Taliban appear to be on the verge of reconstituting the so-called Islamic Emirate of Afghanistan proto-state that was toppled in late 2001 by U.S., coalition and indigenous forces. A series of factors indicate that the Afghan government could implode from within or be swiftly overthrown by the Afghan Taliban unless the United States continuously reinforces Kabul with ample political-military aid. In addition, any future U.S.-led military reengagement would likely amount to a replay of the events of late 2001 or worse, thereby prolonging the war. Lastly, there is little reason to expect that the Afghan Taliban leadership will temper its ideological aspirations, sever ties with designated terrorist groups, or moderate its governing style in return for international recognition or under threat of punitive repercussions. As such, how the United States manages its anticipated withdrawal in the coming months will have major ramifications, and America should prepare for the possibility of an historical recurrence of the collapse of the Afghan government reminiscent of the downfall of the Soviet-sponsored Communist regime in 1992.

Dr. Sullivan's another article "The Crumbling Kyrgyz Republic" in *Asian Affairs* (2021) investigates the aftermath of the 2017 transition from Almazbek Atambaev to Sooronbai Jeenbekov, which gave way to the former's arrest and imprisonment. A series of other prior arrests and incarcerations of (former) parliamentarians indicate that Kyrgyzstan's presidents are regularly manipulating the legal system to persecute and neutralize their rivals. Dr. Sullivan argues that the repetitive rupturing of legal institutions will usher in an era of heightened illiberalism, elite uncertainty, and the further discrediting of the political system, thereby placing the state on the brink of failure. The mass uprising in response to the October 2020 parliamentary electoral results and most recent coup d'état indicate that the prospects of the Kyrgyz Republic suffering a collapse are real.

Dr. Sullivan also published a piece "Passing the Torch in Central Asia: Transition Dynamics in Uncertain Times" in *CABAR.Asia* (2021), which traces how three new Central Asian leaders differ in terms of their respective governing styles and how they seek to shape state-society relations. The newly independent countries of Kazakhstan, Tajikistan, Turkmenistan, and Uzbekistan exhibit varying modes of authoritarian governance today. While Turkmenistan and Uzbekistan have experienced maiden transitions at the highest levels and retained non-democratic systems, Kazakhstan and Tajikistan are still contending with this issue. Differing degrees of coercion combined with the level of maneuverability of sitting presidents explain the political variation observed in Central Asia.

DR. HELENE THIBAULT EXPLORES HOW POLITICAL ETHNOGRAPHY CAN CONTRIBUTE TO THE STUDY OF RELIGIOUS DYNAMICS WITHIN CONSERVATIVE RELIGIOUS COMMUNITIES

In an article "Are You Married?": Gender and Faith in Political Ethnographic Research," published in the *Journal of Contemporary Ethnography* (2021), Dr. Helene Thibault, Assistant Professor in the Department of Political Science and International Relations, takes a reflexive stance by arguing that her informants in the fieldwork in Tajikistan used her status as a single foreign woman to steer interactions toward those of her religious conversion and need for marriage. Their repeated efforts and our interactions exposed the depth of their religious beliefs and its precedence over other identity markers such as ethnicity and language. This close access also allowed Dr. Thibault to witness the exclusion and distrust that conservative Muslims face from the rest of the society as well as state authorities. Dr. Thibault argues that political ethnography enables the production of a more nuanced portrait of conservative Muslims communities, which are often represented as hermetic and hostile. Political ethnography can be particularly useful to investigate sensitive issues such as religious identities and their complex relations to structures of power.

SHARED BY PROF. ALEXEI TROCHEV

Graduate School of Public Policy News

RESEARCH GRANT ON WATER RESOURCES MANAGEMENT IN UZBEKISTAN

Dr. Stefanos Xenarios

Assoc.Prof. Stefanos Xenarios and Asoc. Prof. Peter Howie have received a grant from World Bank which is coordinated from the Leibniz Institute for Agrarian Development in Countries with Transition Economies (IAMO) for the development of interdisciplinary research in the area of water resources management in Uzbekistan. The intention is to create a Network of Excellence with European and Central Asia universities in the area of water and natural resources management.

Dr. Peter Howie

RESEARCH GRANT ON URBAN WATER SUPPLY AND WASTEWATER SYSTEMS IN KAZAKHSTAN

A team of Nazarbayev University led by Assoc.Prof. Stefanos Xenarios and composed by the PhD students of GSPP Ms. Aliya Assubayeva, Mr. Bekmurat Talipov, and CPS Teaching Fellow Ms Aziza Baubeboka has received a research grant from Corvinus University to develop a study on Urban Water and Wastewater Supply Systems (WWS) in Kazakhstan. The study will assess the challenges of WWS in Kazakhstan and their potential performance improvement while the relevance with other WWS systems in Central Asia will be explored.

RESEARCH GRANT ON SET UP UNSDSN CENTER IN NAZARBAYEV UNIVERSITY

The Lee Kuan Yew School of Public Policy (LKYSPP) has provided a grant to Assoc.Prof. Stefanos Xenarios for the setup of the United Nations Sustainable Development Solutions Network (UN SDSN) in Kazakhstan by making Nazarbayev University a focal point for the country. The aim of this research grant is to enhance research and development activities on SDGs in Kazakhstan and more broadly in Central Asia. The Graduate School of Public Policy (GSPP) will serve as the secretariat for SDSN in NU. Different initiatives related to research on SDGs in Kazakhstan and Central Asia will be encouraged trough the SDSN by communicating with universities and institutes from the region with similar interests.

BEST RESEARCH PAPER AWARD PUBLISHED IN THE CAJWR

Deadline for manuscript submission is July 31, 2021*

More information on competition and guidelines https://water-ca.org/

- UPON MEETING ALL THE JOURNAL REQUIREMENTS

AWARDS*

1st place- USD 1000*
2nd place - USD 700*
3rd place - USD 500*

*BASED ON EXCHANGE RATE AS OF THE ANNOUNCEMENT DATE, INCLUDES TAXES

The goal of the Best Published Research Paper Awards is to acknowledge excellent research performed by the authors in the area of Climate change in Central Asia. It's an ongoing effort to promote top quality research by the Central Asian Journal of Water Research. The selected articles will be also presented on the CACIP Geoportal.

The submitted research articles must be in English, Central Asia –related with reference to one of the four thematic clusters:

1. Climate and Environment (sustainable water management, hydrological cycle in Central Asia, mountain hydrology, climate impact assessment on water resources, application of remote sensing data in hydrology, hydrological forecasting, climate variability and change, groundwater resources and modeling, flood hazards and disaster risk reduction);
2. Socio-Economics (natural resources management, environmental policy and economics, decision aiding systems, hydro-economic modeling, water-energy-food nexus, agricultural policy and rural development, stakeholder analysis);
3. Water Law and governance (water law, water cooperation and diplomacy, policy analysis);
4. Water infrastructure and management systems (industrial wastewater management, water quality, water treatment, urban water management, sewage sludge recycling, banks erosion, soil remediation, water infrastructure).

For more information, please proceed with the link.

DR. MAXAT KASSEN PUBLISHED AN ARTICLE IN A PRESTIGIOUS INTERNATIONAL IMPACT FACTOR JOURNAL

Dr. Maxat Kassen, Assistant Professor of the Graduate School of Public Policy at Nazarbayev University, has recently published an article in a famous international peer-reviewed research journal: *Innovation: Organization & Management* (Impact Factor 2.962). The article titled "Understanding motivations of citizens to reuse open data: open government data as a philanthropic movement" aims is to understand the socioeconomic conditions and driving forces that facilitate and motivate civic developers to reuse open data and create their own data-driven services, often on a free of charge, i.e., philanthropic basis. The recent emergence of myriad independent civic open data-driven projects in many parts of the world promise to propose new participatory ways to meet the needs of local communities and find cost-effective solutions to various issues at local levels of governance such as better urban planning, improvement of public transportation routes, crime rates mapping, assessment of public services, public scrutiny of lobbying activity, etc. However, the competitive market in the e-commerce sector often leaves little economic niches for independent civic developers to hope for big revenues from the promotion of such projects, especially considering the fact that the vast majority of them are implemented at local levels and their target audiences are usually small to ensure even economic self-sustainability. In this regard, the purpose of the paper is to understand what motivates civic developers, who often call themselves technically savvy citizens or independent developers, to step in and begin to reuse open data, which is published by local governments, considering that the creation of such data-driven projects is time and money consuming business, and, more importantly, elaborate on what kind of typical challenges these civic stakeholders face on the way.

The full article can be read by the following academic reference:

Kassen, M. (2021). Understanding motivations of citizens to reuse open data: open government data as a philanthropic movement. Innovation, 23(1), 44-70.

School of Medicine News

SUCCESSFUL HEART TRANSPLANTATION AFTER 17 H EX VIVO TIME

EIn 1958, surgeons performed the first open-heart surgery in Kazakhstan. The discipline developed slowly, with approximately 200 surgeries performed each year. Since gaining independence in 1991, 26 cardiac surgery centers have been established across the country, and in 2014, there were more than 8000 cardiac surgeries performed in Kazakhstan. The National Research Cardiac Surgery Center (NRCSC) is a University Medical Center (UMC) hospital which initiated a country-wide mechanical circulatory support program in 2011 followed by a heart transplant program in 2012. Dr. Yuri Pya (cardiac surgeon and CEO of UMC) and his team have performed 79 heart transplants at NRCSC since 2012. Because of the low population density and long distances between cities in Kazakhstan, the time of organ donor transportation to Astana may take many hours. Donor hearts can be preserved using conventional methods (ice) or mechanical means. To ensure donor heart preservation, Dr. Pya and colleagues use normothermic ex vivo perfusion—the Organ Care System. In this system (Figure 1), oxygenated blood is pumped into the aorta, perfusing the coronary arteries. The coronary sinus flow then is ejected by the right ventricle into a pulmonary artery catheter and returned through a low resistance membrane oxygenator to a blood reservoir.

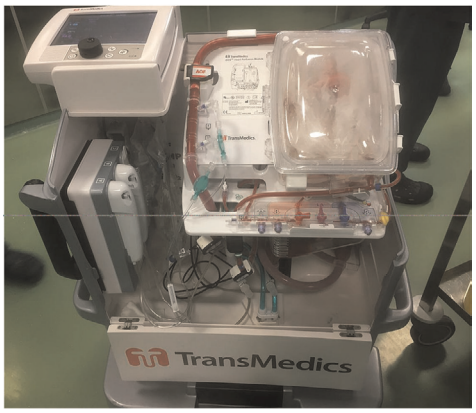


Figure 1: TransMedics Organ Care System. An oxygenated blood is pumped into the aorta, perfusing the coronary arteries. The coronary sinus flow then is ejected by the right ventricle into a pulmonary artery catheter, and returned through a low resistance membrane oxygenator to the blood reservoir. Pulsatile flow is generated by a diaphragmatic pump.

Dr. Assel Medressova, MD PhD, cardiac surgeon, Dr. Linar Faizov, MD, perfusiologist, **Dr. Aidyn Kuanyshbek**, MD, head of the intensive care unit department, **Dr. Rymbai Kaliyev**, MD, head of the O.R. with mechanical circulatory support laboratory, **Dr. Gulzhan Myrzakhmetova**, MD Cand MedSci, head of Cardiology Department #2, **Philip la Fleur**, Assistant Professor of Practice at NUSOM and **Dr. Pya**, MD DMSc, cardiac surgeon, CEO of UMC, Director of Surgery and Research at NRCSC, report a heart transplant case in which there was an ex vivo donor heart time of 17 hours using the Organ Care System. This is one of the longest ex vivo transport times ever reported. The recipient was a 48-year-old man with a long history of heart diseases. The donor heart was retrieved from a 60-year-old woman who had had a hemorrhagic stroke. Since the transplant 3 years ago, the patient has been regularly seen at the NRCSC for follow-up and his clinical status and exercise capacity were good; he has returned to normal life and he currently works as an engineer. The case has been published in the recognized Journal of Cardiac Surgery, that is in second quartile in surgery; **Q2**.

Dr.Pya and team in the theatre.

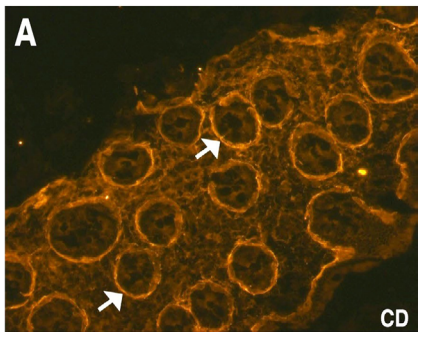
Medressova, A, Faizov, L, Kuanyshbek, A, Kaliyev, R, Myrzakhmetova, G, la Fleur, P, and Pya, Y. Successful heart transplantation after 17 h ex vivo time using the Organ Care System—3 years follow-up. J Card Surg. 2021; 1– 4.

CERTIFICATE AND MEDAL "FOR MERIT IN THE DEVELOPMENT OF SCIENCE OF THE REPUBLIC OF KAZAKHSTAN» AWARDED TO ABDUZHAPPAR GAIPOV

Dr. Abduzhappar Gaipov, Assistant Professor in NUSOM was awarded with a certificate and medal "*For merit in the development of science of the Republic of Kazakhstan*'', signed by the Minister of MES Mr. Askhat Aimagambetov. Currently, Abduzhappar is the PI and co-PI of three projects and has published more than 80 articles and one of the most cited authors among Kazakhstani young researchers. Also, his MES research proposal "Epidemiology and Forecasting of Infectious Diseases in Kazakhstan Using Big Healthcare Data, Mathematical Modeling and Machine Learning" has been approved by the decision of the National Research Council for 2021-2023.

NEW INSIGHTS INTO INFLAMMATORY BOWEL DISEASE (IBD)

Ulcerative colitis (UC) and Crohn's disease (CD) are examples of **Inflammatory Bowel Disease** (IBD) in which chronic inflammation of the digestive tract occurs leading to persistent diarrhea and increases the risk of tumor development in the intestine. IBD is a complex immune-mediated polygenic disease, in which the dysregulation of key immune signaling pathways has been identified as an important operating mechanism. Several studies suggest that periostin is a key player in the development of tissue fibrosis through mechanisms involving complex interactions between the extra-cellular matrix (ECM) and cell-surface αv-integrin receptors, localization of fibrogenic inflammatory mediators and regulation of mesenchymal growth factors. In a collaboration with a team in the University of Southampton and a team here in Nazarbayev University School of Medicine, including **Dr. Eva Riethmacher**, joint-first author and Assistant Professor, **Dr. Ashimkhanova**, an expert on Clinical Gastroenterology/Hepatology and Instructor, **Mr. Khojanazarov**, a current NUSOM Master in Molecular Medicine (MMM) student, **Ms Mukanova** a former MMM graduate and current research assistant, **Mr. Borrisenko** a former NU School of Science Technology graduate and current research assistant, **Dr. Adrisova** a University Medical Center doctor and paediatric IBD expert and **Dr. Dieter Riethmacher**, a Full Professor and Vice Dean for Research and Graduate Studies, we investigated periostin in pediatric IBD (pIBD) including its relationship with disease activity, clinical outcomes, genomic variation and expression in the colonic tissue. The study explored the feasibility of using periostin serum levels and expression profile to assess disease activity in pIBD, and its role in inflammation and repair. The manuscript has been published in a recognized Multidisciplinary Journal, Scientific Reports, that is in the first quartile; **Q1**.



Immuno-fluorescence staining for periostin in colonic tissue. The figure shows representative periostin immuno-fluorescence on the colonic tissue obtained from controls and IBD patients in the active state. Note the distinctly localised peri-cryptal rings that can be seen in CD.

Coelho, Tracy, Eva Sonnenberg-Riethmacher, Yifang Gao, Enrico Mossotto, Alisher Khojanazarov, Annie Griffin, Saida Mukanova, Aiymkul Ashimkhanova, Rachel Haggarty, Anton Borissenko, James J. Ashton, Imogen S. Stafford, Akshay Batra, Nadeem A. Afzal, Michael P. Stanton, Bhumita Vadgama, Kapura Adrisova, Robert M. Beattie, Anthony P. Williams, Sarah Ennis, and Dieter Riethmacher. 2021. 'Expression profile of the matricellular protein periostin in paediatric inflammatory bowel disease', Scientific reports, 11: 6194.

NEWS ON ENDOMETRIOSIS USING PUBLISHED DATA – A SYSTEMATIC REVIEW

Dr. Antonio Sarria-Santamera

Endometriosis causes significant morbidity among premenopausal women: it is a chronic painful condition that has a negative impact on a patient's physical and emotional well-being, quality of life, and productivity, placing a significant economic and social burden on patients, their families, and society as a whole. A group of researchers from Nazarbayev University School of Medicine, including **Dr. Terzic**, a gynecologist and Full Professor, **Dr. Issanov**, epidemiologist and Instructor, **Ms. Orazumbekova**, a NUSOM Master in Public Health graduate, and **Dr. Sarría-Santamera**, a public health doctor and Associate Professor, worked together to analyze existing data regarding the frequency of **Endometriosis** using meta-analysis, a statistical technique that pools together data and provides with more robust estimates of the frequency of health problems than those obtained in individual reports of cases. Endometriosis is a complex and heterogeneous condition that is characterized by the growth of uterine-like tissue outside the uterus. Despite extensive research commencing 160 years ago, much controversy and dilemmas remain regarding this complex and enigmatic disorder, related to its cause, development, diagnosis and overall clinical management, or prognosis.

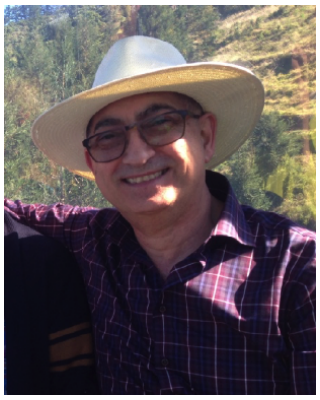
One of those uncertainties is precisely what the frequency of this disease is. A common assumption is that around 10% of women suffer from endometriosis. But these data have not been definitely confirmed

The conclusions of the work they conducted are that the frequency of women who have endometriosis, the prevalence of this disease, is around 0.1-0.5 per 1,000 women and that every year between 1.4-3.5 out of every 1,000 women will be diagnosed with endometriosis, the incidence.

The variability observed in those estimations may be due to methodological variations in the different studies analyzing the incidence and prevalence of endometriosis, but also to the inherent heterogeneity of endometriosis, a disease which whose cause is unknown, and that does not have a specific diagnostic test (either through imaging like x-rays of ultrasound or through a laboratory test). Diagnosis is usually done by clinicians analyzing the symptoms indicated by women and could only be confirmed in a biopsy. Endometriosis does not have treatment either: doctors may use a combination of pain killers and hormonal therapies to control this disease but on many occasions, surgery is the only alternative to alleviate the pain, and improve the quality of life and well-being of women suffering from endometriosis. The manuscript has been published in a recognized Journal in Health Care and Health Policy that is in the first quartile; **Q1**.

Sarria-Santamera, A.; Orazumbekova, B.; Terzic, M.; Issanov, A.; Chaowen, C.; Asúnsolo-del-Barco, A. Systematic Review and Meta-Analysis of Incidence and Prevalence of Endometriosis. Healthcare 2021, 9, 29.

DR. MANHAL SIRAT AND HIS COLLEAGUES AT KHALIFA UNIVERSITY HAVE PUBLISHED A PATENT



Prof. Manhal Sirat

Dr. Manhal Sirat, Associated Professor of Geology at the SMG, and his Colleagues at Khalifa University in Abu Dhabi, UAE has published a patent, which has several significant applications in petroleum and mining industries as well as in civil engineering discipline.

Their patent (US 10,880,625 B2, 29 Dec. 2020) is titled "Self-Powered Microsensors for In-Situ Spatial and Temporal Measurements and Methods of Using Same in Hydraulic Fracturing".

The patent involves mapping hydraulic fracturing in deep petroleum reservoirs and measuring the in-situ stresses in real time using smart micro-sensors (SMS). Smart (self-powered) microsensors refers to the capability of the microsensors to generate sufficient power to operate the electronics in the microsensor, for example, by harvesting energy in the environment. The microsensor design (e.g. the types of sensor elements, the types of energy harvester, or the types of circurity) may depend on the particular application of the microsensor.

APPLICATION TO THE PETROLEUM AND RENEWABLE (GEOTHERMAL) ENERGY

Hydraulic fracturing (usually known as Hydro-fracking) is the process used to create artificial fractures by pumping a fluid under high pressure into specific isolated zones inside a wellbore to initiate fractures into the target rock formation in order to increase its permeability for better production of oil and gas, and or to enhance a circulation of water for geothermal energy production. The uncertainty is high in predicting the size (length and width) of the resulted hydro-fracture as well as its direction, upon which a successful production of oil and gas and or the successful circulation of water from the injection well into the production well in a geothermal production depends on.

This patent introduces the application of the SMS, which are tiny in size (ca. one square millimeter, Fig. 1), which can be injected together with the pumped fluid that is used to create the hydro-fracture, hence will be carried on into the created fractures. Once the pumping is ceased, the ambient stresses will close the fracture onto the embedded SMS, which communicate to each other by specific pinging to locate their positions, which can be received by the down-hole station, and from there to the surface indicating to which extending size and in which direction the fracture has reached (Fig. 2).

Some of the SMS can be embedded into proppants, which are small pebbles of ceramic used to be injected with the pumped fluid to keep the created hydrofractures opened once the pumping is ceased. In such a case, the ambient in-situ stress will be applied to those proppants (Fig. 2), which in turn transmit the stresses to the SMS that are able to measure the in-situ stress in real time and conveyed these measurements to the surface throughout their communications.

Needless to mention how expensive is the measuring of the in-situ stress during and after drilling, and how significant the in-situ stress measurements and the fracture mapping are.

They can provide a guideline to the drilling operations about the safe and optimal mud weight to be used in drilling new wells in the field or the reservoir under production. They can also help in deciding where the injection wells should be placed and which development plan should be used for developing these reservoirs.

OTHER POTENTIAL APPLICATIONS

Some other applications of SMS can be applied to monitor the grouting efficiency in mining, and to map the fractures in Headrace tunnels, and to map the internal erosions within an embankment dams, to monitor the possible leakage within a radioactive waste repository, among other applications.

US010880625B2

(12) **United States Patent**
Sassi et al.

(10) **Patent No.: US 10,880,625 B2**
(45) **Date of Patent: Dec. 29, 2020**

(54) **SELF-POWERED MICROSENSORS FOR IN-SITU SPATIAL AND TEMPORAL MEASUREMENTS AND METHODS OF USING SAME IN HYDRAULIC FRACTURING**

(71) Applicants: **Khalifa University of Science And Technology**, Abu Dhabi (AE); **ABU DHABI COMPANY FOR ONSHORE PETROLEUM OPERATION LIMITED**, Abu Dhabi (AE)

(72) Inventors: **Mohamed Ben Mahmoud Sassi**, Moknine (TN); **Manhal Sirat**, Uppsala (SE); **Irfan Abdulqayyum Saadat**, Santa Clara, CA (US); **Rashid Kamel Abu Al-Rub**, Amman (JO)

(52) **U.S. Cl.**
CPC ***H04Q 9/00*** (2013.01); ***A61B 5/05*** (2013.01); ***E21B 41/0085*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC E21B 43/26; E21B 41/0085; E21B 47/00; E21B 47/06; H04Q 9/00
(Continued)

(56) **References Cited**

U.S. PATENT DOCUMENTS

6,324,904 B1 12/2001 Ishikawa et al.
6,443,228 B1 9/2002 Aronstam et al.
(Continued)

Pictures/diagrams

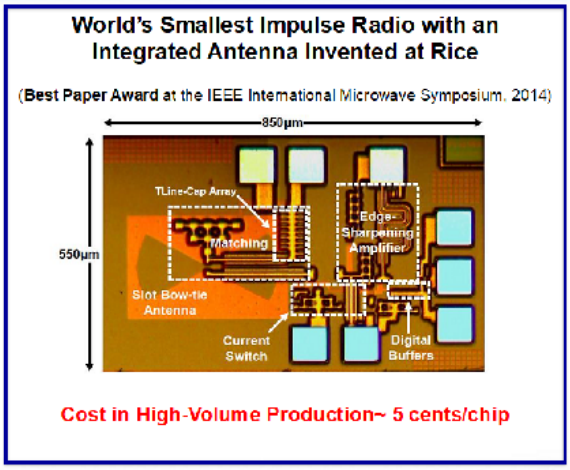


Fig. 1. An example of a Smart Micro-Sensor (SMS). (Curtsey to Rice University)

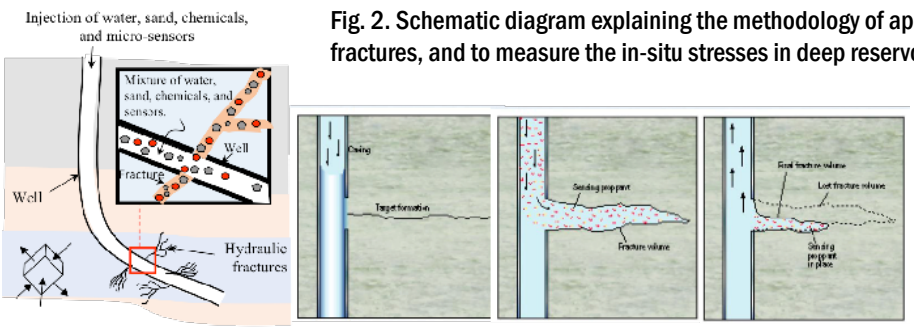


Fig. 2. Schematic diagram explaining the methodology of applying the SMS to map the hydraulic fractures, and to measure the in-situ stresses in deep reservoirs.

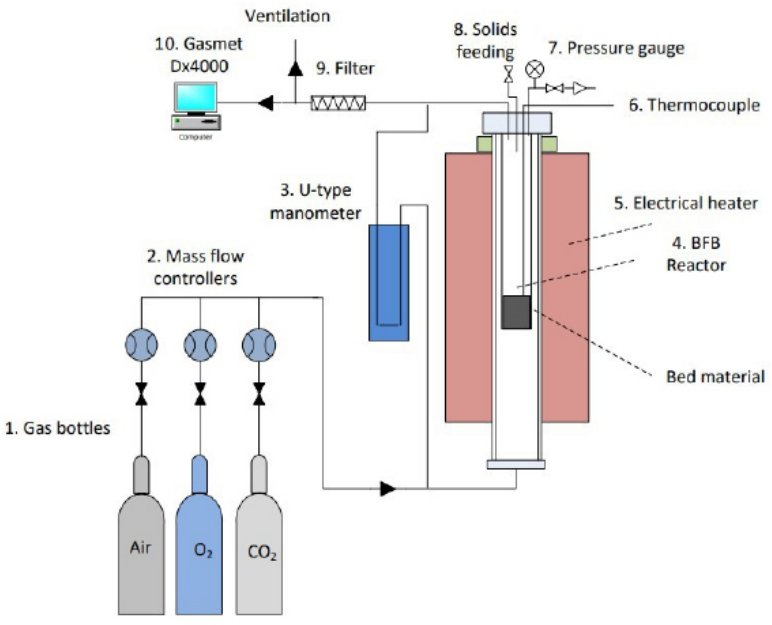
ATTRITION OF HIGH ASH EKIBASTUZ COAL IN A BENCH SCALE FLUIDIZED BED RIG UNDER O2/N2 AND O2/CO2 ENVIRONMENTS

Authors: *Botakoz Suleimenova, Berik Aiymbetov, Dhawal Shah, Edward J Anthony, Yerbol Sarbassov*

The research team of School of Engineering and Digital Sciences (SEDS) in collaboration with University of Ottawa would like to share their latest research article on the conversion of low rank bituminous coal in air and oxy-fuel environment. The article has been published in the prestigious journal of Fuel Processing Technology. The full article is available at the following link.

ABSTRACT

While fluidized bed coal combustion technology has advanced significantly, attrition and its impact on combustion remains a problem. Using a bench scale fluidized bed unit, we examined the experimental attrition data for batches of coal ash particles. Experiments were carried out in the presence of bed material (sand) by adding coal particle to the hot riser, which has a height of 500 mm and internal diameter of 25.4 mm (See Figure). The study was carried out with coal particles of 0.4-0.8 mm (d1) and 0.8-1.4 mm (d2) under two different gas environments. Using this data, the effect of critical factors on attrition such as gas velocity, particle size, and combustion environments were analyzed. In addition, the composition of ash particles was analyzed by SEM/EDX and XRF. It was observed that the attrition of particle increased with an increase in gas velocity independent of the change in the combustion environment. The results also suggest that combustion a high CO2 environment is also comparable to that in air suggesting that this has no major negative effects on attrition. Particle breakage was also observed after attrition at high temperature in fluidized bed reactor and the surfaces of particles clearly underwent severe rupture and formed porous and agglomerated structures. The porous structure was described as formation of the unburnt char particles which occur due to low reactivity of Ekibastuz coal. Number of the analyses showed that Ekibastuz coal ash particles have a dominant composition of alumino-silicate. Therefore, it was concluded that Ekibastuz coal has a considerable propensity to accumulate ash particles in the reactors due to low reactivity and featured ash composition.



SHORT BIO OF AUTHORS

MSc Suleimenova Botakoz is a research assistant at School of Engineering and Digital Sciences, Nazarbayev University. She has a bachelor degree from Eurasian National University and MSc from Tokai University in applied chemisty. She employed as teacher's assistant at Nazarbayev Intellectual School (2014-2015) and as teacher assistant at the Department of chemistry at Eurasian National University (2018-2019).

MSc Berik Aimbetov is a researcher at at SEDS at NU. He has bachelor degree and MSc from Bauman Moscow State Technical University, Energy machines department. Berik participated in several projects "Development on municipal solid waste combustion and investigation of municipal solid waste blending effects on reactivity of coals in CFB combustion and gasification processes" (2017-2019), "Clean coal technologies. Improving the energy efficiency of coal-fired power plants in Kazakhstan, coal gasification" (2015-2017), "Utilization of low-potential heat on industrial plants of Kazakhstan" (2014-2015).

Dr. Dhawal Shah is assistant professor in the department of Chemical and Materials Engineering at Nazarbayev University (NU) since August 2015. He received his Ph. D. degree in Chemical and Pharmaceutical Engineering from Singapore-MIT Alliance at National University of Singapore. Prior to joining NU, he has been working as lecturer and assistant professor at Middle East Technical University in Cyprus and in Sultan Qaboos University, Oman, respectively. His research expertise is in modeling and simulations of chemical processes.

Dr. Edward J Anthony is a Professor at the Department of Chemical and Biological Engineering of University of Ottawa. Previously Dr. Anthony was Professor at Cranfield University in the Department of Energy Process System in the Center for Power Engineering. He was a head of combustion and CCS center at Cranfield University and leading senior research scientist with Natural Resources Canada, where he headed the Gasification and Fluidized Bed Combustion Group.

Dr. Yerbol Sarbassov is a postdoctoral scholar at the Chemical & Materials Engineering Department at SEDS at NU. He graduated with an engineering degree at Almaty Institute of Power and Telecommunications 2001-2006 and subsequently worked in industry for 3 years. He obtained MSc degree on Energy Conversion at the University of Nottingham (UK) in 2010 and PhD at the School of Engineering of Cranfield University (UK) in 2016. Yerbol has published over 20 journal articles and a similar number of conference proceedings and regularly acts as reviewer for several international journals

PREPARED BY DR. YERBOL SARBASSOV

HYDROGEN FUEL CELLS AS THE ONLY LONG-TERM ALTERNATIVE FOR EMERGING ELECTRIC VEHICLE TRANSPORTATION?

Authors: Desmond Adair, Martin Jaeger

Lithium-ion batteries are by far the most common choice to power electric vehicles (EVs) today as they have a higher energy density than other technologies. However, now as lithium-ion batteries are the predominant choice, questions involving the viability of such a method of primary power are timely, if not overdue. It is the intention here to discuss the two main alternatives for electric vehicle transportation and hence give pointers as to what should be currently happening and what to plan for in the future.

Today such companies as Tesla and their competitors dominate the debate as to what is to be the future of electric propulsion and emphasize battery-power electric powered vehicles. This is seemingly with disregard for another green transportation technology currently being used, i.e., hydrogen technology, with hydrogen being the most abundant element in the universe. It would seem logical to develop a technology for which there is a limitless fuel rather than concentrate on battery power for automobiles. It is clear however that it is not the view of Elon Musk who has said, although not recently, about hydrogen fuel cells that “success is not possible” and this view has been backed up by the research and development policies of the majority of automobile manufacturers. Nevertheless, most have not quite given up on hydrogen, in that they do see it as a viable alternative to gasoline and Diesel propulsion.

Fuel cell electric vehicles (FCEVs) combine hydrogen stored in a tank with oxygen from the air to produce electricity with water vapour as the by-product. Fuel cell powered vehicles currently have more than a 500 km range, and can be filled up just as quickly from service stations as gasoline or Diesel. However, although fuel cells themselves provide no harmful emissions, to source pure hydrogen by using, say reformers and natural gas, currently leads to pollution. Still, the impact on the environment is less than that of gasoline driven vehicles.

There are many variations of lithium-ion batteries with continuous development constantly taking place, for example, lithium-sulphur and lithium-air as well as other elements being considered, for example, zinc-air. All have advantages and disadvantages. Lithium-sulphur batteries have received increased attention in that they have some 4.5 times higher theoretical capacity and the much lower cost of sulphur cathodes when compared to typical Li-ion insertion cathodes [1]. However sulphur cathodes have several critical disadvantages such as high volume change upon cycling, low conductivity of the sulphur and lithium sulphide phases and relatively high solubility of sulphur species in common lithium battery electrolytes [2]. Lithium-air batteries have an improved specific energy and energy density above Li-S batteries as they use atmospheric oxygen to produce power. Unfortunately their life cycle has, so far, been much lower with a maximum of only around 100 cycles [3]. The improvement of this life cycle has proved difficult because of several problems such as air electrode clogging from lithium discharge products, catalyst degradation from high voltage charging, lithium metal side reactions from atmospheric moisture and irreversible electrolyte decomposition [[4]. Taking zinc-air as an example of an EV battery which is not lithium, it is found that despite having a lower specific energy than Li-air batteries these seem more likely to be used in future EVs because of their more advance technology status and higher practically achievable energy density [5].

Regarding hydrogen fuel cells, the fuel hydrogen can be produced from low (but not zero) carbon sources and stored with a high specific energy relative to most batteries. Fuel cells therefore have the potential to contribute to the decarbonization in the transportation sector. The distinct current advantages of this method of propulsion relative to battery electric vehicles, as already stated above, are higher driving ranges and much faster refuelling. However these advantages have not so far been strong enough to achieve a better market uptake [6]. Cumulative FCEV deployments currently amount to only a small fraction of EV sales (approximately 0.5%). Some reasons for this may lie in the relative technical complexity of a fuel cell with four circuits needed for operation, namely, the hydrogen, air, coolant and humidifier circuits, all having to work in concert. FCEVs have a much higher purchase price than conventional vehicles and battery electric vehicles (BEVs), and in common with BEVs this is often attributed to their electrochemical power supply.

Also the hydrogen storage tank and fuel cell system are especially costly due to the necessary inclusion of expensive materials and equipment such as platinum, carbon fibre, humidifiers and heat-exchangers. As is usual the cost of these components will decline with increased volumes of manufacture except for the notable exception of the platinum-group catalysts as they are already becoming scarce. More research is obviously necessary to reduce the dependency of FCEVS on platinum-group materials. One big disadvantage of FCEVs may be their high cost of fuel. A simple comparison with current cost of gasoline is not straight forward as gasoline is sold by volume and hydrogen is sold by weight. However calculations show that currently the cost of hydrogen fuel is two to three times that of gasoline.

There is a fear that after huge investment in Li-ion battery technology that lithium, being a finite resource will become scarce and therefore inordinately expensive. As with all such reserves (as for example with oil) a peak in production can be expected at some time. Currently the lithium production market is relatively new and there is some nervousness concerning giving any firm conclusions about future resource discovery and production. It is true that a higher cost of lithium will enhance innovation and increase production. However, with the idea of peak lithium, there is a substantial difference between this resource and that of oil in that many substitutes are available for lithium to be used in the manufacture of batteries. Such examples are calcium, magnesium, mercury and zinc as anode materials. Naturally these substitutes may all face similar resource constraints as lithium but their existence gives flexibility and is a fundamental difference to when finding substitutes for oil.

The safety of FCEVs is a concern as hydrogen is flammable, but actually so are Li-ion batteries. In addition to the safety of a given FCEV there is additional safety risks when transporting hydrogen, usually under high pressure, to refuelling stations due mainly to leaks. However, in California, industry has been transporting hydrogen for decades with no serious incidents reported. Also the US National Fire Protection Agency have stated that “alternative-fuelled vehicles, a category which includes both hydrogen fuel cell and battery-powered electric, are not more hazardous than traditional internal combustion engines.

Three sectors of the EV emerging market that are not well served by current lithium-ion powered electric vehicles are the long-range, low-cost and high-utilization transportation markets. For long-range transport, ‘range anxiety’ is the most often the common complaint. Consumer willingness to invest in BEV usually comes down to cost, but in places like the US where driving distances can be longer than say in the UK, and the population tend not to use public transportation nearly as much, then range would be a factor. Ideally a substantially improved range for a BEV would have to be accompanied without an increase in cost to satisfy the long-range market. Regarding low-cost transportation market, which is expected to grow with emerging countries such as China and Brazil continuing to industrialize, it is currently underserved by BEVs not only because of the initial cost of the vehicle but also the cost of refuelling. Development of electrochemical storage costing much less than now is needed for emerging markets, and technologies with a higher specific energy and similar cost to Li-ion batteries could help by reducing energy consumption. High utilization transportation provides special implications for the energy storage technology used in EVs. The charging time becomes critical (it is about one hour at the moment) to avoid disruption to schedules; however, fast charging can often lead to cell degradation and overheating (safety issue). High utilization have a large weight (trains, trucks, buses) and so battery packs must be scaled to large proportions. This can led to thermal management problems with less heat dissipation and again cell degradation. Several of the above problems can easily be overcome by using hydrogen as the source of energy. Certainly range would no longer be a big factor and use of heavy vehicles would be more conducive to fuel cell propulsion. One problem at the moment however is that the infrastructure for hydrogen infrastructure is still in its infancy as compared to that for BEVs.

So what is the outlook for the use of BEVs and FCEVs? Both technologies are in need of improved specific energy and energy density, and production at a lower cost. More attention is needed to be given to safety and grid compatibility. It would seem that no technology may be suitable for every application but rather, for the moment at least, each will be directed to the most appropriate of the EV markets. Further development of Li-ion batteries or batteries with other main elements will probably improve the range of EVs together with the replacement of structural or energy absorbing

components and enhancement of energy recuperation. It is fairly clear, the fuel cell propulsion units are a good fit with high utilization transportation and for long distance travel, including sea and air transportation. Certainly Li-ion batteries possess the best combination of properties for specific electric mobility applications but with careful targeting, a diverse mix of battery and fuel cell powered electric vehicles will enhance the ability of transition to a world of clean low-carbon transportation. In answer to the question initially posed in the title, it would appear from the above that hydrogen fuel cells may not be the only alternative for electric vehicle transportation. They certainly have a role to play in certain sectors of the transportation market but BEVs also have a major and sustainable role.

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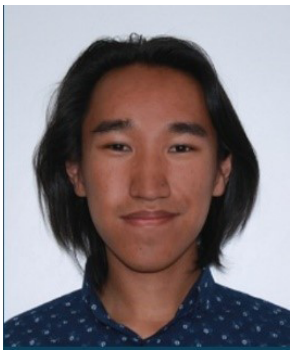
UAV-ASSISTED CONTENT PLACEMENT MANAGEMENT IN HETEROGENEOUS CACHE NETWORKS



By Elnur Rakhmatullin

An exponentially growing nature of network traffic worldwide places extreme demands on even state-of-the-art equipment. Recent developments in unmanned aerial vehicles (UAV) technology, such as low-latency high-speed mmWave beamforming, targeted dynamic line-of-sight (LoS) communication, present them as practical solutions for improving network performance. A typical architecture consisting of small cell base stations (SBSs) connected to a central metropolitan area network (MAN) via a backhaul link and serving user equipment (UE) within its coverage is analyzed. The project's aim is to improve performance characteristics (throughput, delay, etc.) of such a network using an array of UAVs in different modes of operation (as high-speed LoS wireless backhaul links, mobile caching stations, etc.). The project presents a comprehensive analysis of UAV-assisted content placement for cache hit-rate improvements of a heterogeneous network employing a mix of aerial-and stationary SBSs utilizing state-of-the-art delivery optimization algorithms based on graph-coloring. A holistic framework is developed accounting for a variety of relevant variables: a choice caching scheme, SBS radius, SBS density, file size and popularity, SBS memory constraints, and the like.

As shown in Figure 1, the preliminary results of the proposed scheme based on the graph coloring algorithms in combination with an increased SBS (UAVs acting as mobile aerial SBS) coverage radius yields best achievable effective hit-ratio in terms of caching performance. Other popular caching schemes – MPF (most popular file), random and a modified scheme (for networks with heavy SBS coverage intersections) are presented for objective improvement measurement. File popularity is modelled by an alpha-parametrized ($\alpha = 0.7$) Zipf distribution. Accounting for high mobility of UAVs, the developed framework was optimized for rapid re-caching in case of cache hit-rate dropping below a specified threshold.

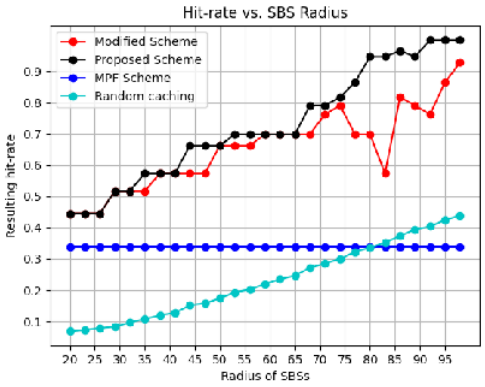


Figure 1 - Hit-rate performance of several common caching approaches against an effective SBS radius.

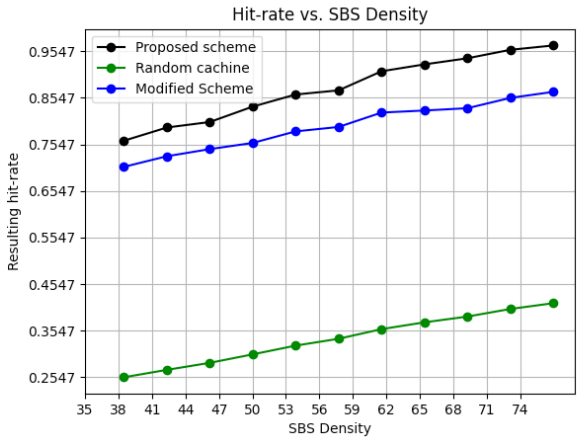


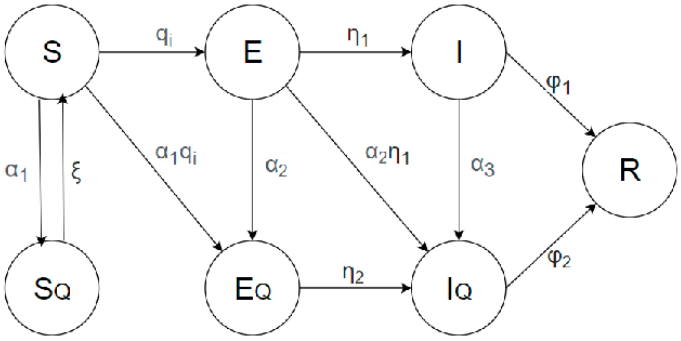
Figure 2: Caching performance against SBS density (modelled as a Poisson spatial process within a 350-m area)

Figure 2 demonstrates the usability of the same schemes adopted for UAV scenarios for both sparse-and ultra-dense SBS-based networks, indicating a statistically significant performance improvement compared to other approaches, thus demonstrating the framework's high customizability. Special attention was paid to framework extensibility for any type of file popularity distribution and ensuring compatibility in simulating any desired network for reproducibility purposes, taking into account all relevant developments from recent research.

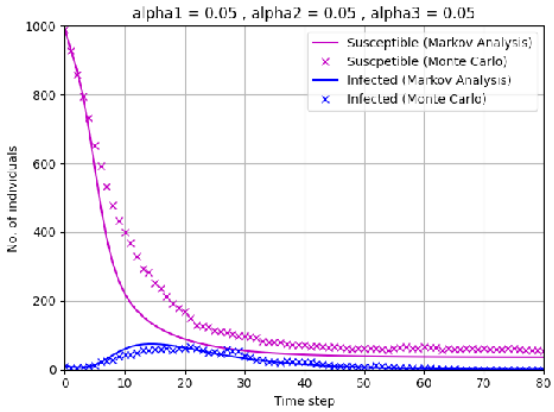
MODIFICATION OF EPIDEMIC SPREADING MODEL BY ADDING QUARANTINE STATES

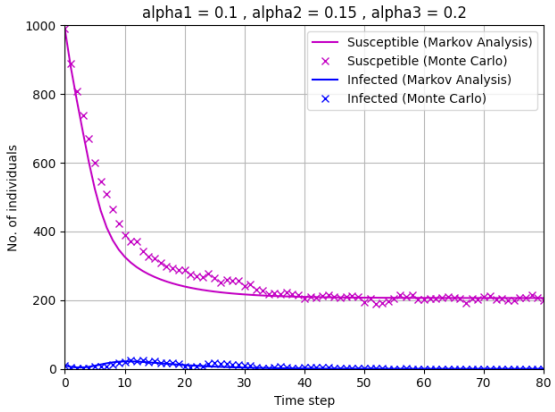
By Sanzhar Talgatuly

Experiencing the ongoing epidemic of the COVID-19 disease, it is a standard practice to model the spreading of the infection in order to get an approximate picture of how the epidemics will behave in the near future. The development of an accurate model requires taking into account many crucial factors, such as, awareness spread, which plays one of the key roles in the distribution of the infection due to the abundance of ways to exchange information without any physical contact. Therefore, a multilayer network is usually chosen to mimic the complexity of the real world interactions. Basically, complex networks comprise physical and virtual layers sharing the same nodes. On the virtual layer individuals state transits between Unaware (U) and Aware (A), depending on their virtual interactions. Meanwhile, the physical layer of the SEIR model involves Susceptible (S), Exposed (E), Infected (I) and Recovered (R) states. However, it appears that there are no models that include the quarantine state, which is one of the main approaches to fighting the COVID-19 spread implemented by most of the countries, including Kazakhstan. Hence, a model was developed, which takes into account the quarantine factor and includes three new states, namely, Susceptible-Quarantined (SQ), Exposed-Quarantined (EQ) and Infected-Quarantined (IQ). As shown in Figure at the right, each transition has its own asserted probability.



For simulation of the model, a Barabasi-Albert network was used, with a population size of 1000 nodes and 10 infected agents on each layer. In order to ensure the accuracy of the model both Markov Chain analysis and Monte Carlo simulation approaches were performed. Because the novelty of the model is the addition of quarantine states, the effects of varying α values, which stand for the transition to quarantine state probability, were examined. According to Figures below, for relatively low values of αalmost all of the population in the network undergo either the infected or exposed state. Whereas, for higher values of α the number of susceptible individuals stabilizes at approximately 20%, meaning that one fifth of the population does not contract the infection. Hence, it goes without saying that quarantine is a highly effective approach to fighting the spread of infections, including COVID-19.





NEW INTERNATIONAL PROJECT WILL IMPROVE GENDER EQUALITY, INCLUSION AND AWARENESS IN HIGHER EDUCATION

Gender on the higher education learning agenda internationally: Co-constructing foundations for equitable futures

The new international project being led by the University of Sussex in the United Kingdom, is a collaboration between five international university partners: University of Sussex (United Kingdom), University of Ibadan (Nigeria), Cadi Ayyad University (Morocco), OP Jindal Global University (India) and Nazarbayev University (Kazakhstan). The project, "**Gender on the higher education learning agenda internationally: Co-constructing foundations for equitable futures**," commenced in January 2021 and will run until December 2022. It is funded by the British Academy under the Global Challenges Research Fund Programme.

For Kazakhstan, the Research Country Lead is **Dr. Anna CohenMiller**, Assistant Professor in the Graduate School of Education (GSE) and Co-Founding Director of The Consortium of Gender Scholars (GenCon) at Nazarbayev University (NU). Working with her is GSE alumni, **Aigul Rakisheva**, Research Assistant at GSE and with GenCon.

The research sets out to further gender equality in international contexts by developing understanding and increasing gender inclusion and awareness in the focus and approach of higher education (HE) teaching in universities across five countries. Mainstreaming gender in higher education is a strategic means to driving wider social change through affecting thinking, beliefs and behavior of decision-makers of tomorrow. This makes the research key to promoting diverse positive social outcomes including across poverty, health, infant mortality, gender violence and

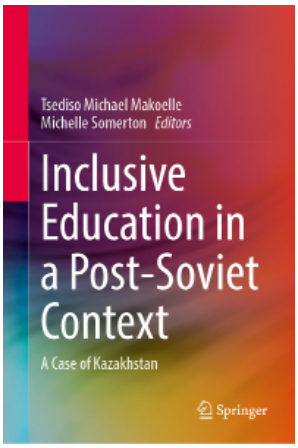
early marriage (Kassem 2019). An established interdisciplinary team of feminist academics from each university will collaboratively generate new insights from staff and student surveys and interviews across disciplines, leading to generation of strategic outputs tailored to diverse international audiences including an openly available toolkit resource for wider impact.

* More information about the project can be found here.

INCLUSIVE EDUCATION IN A POST-SOVIET CONTEXT: A CASE OF KAZAKHSTAN

Makoelle, Tsediso Michael, Somerton, Michelle (Eds.)

This recent publication of Dr Makoelle and Dr Somerton from the Graduate School of Education provides the first evidence-based reference about inclusive education in Kazakhstan, one of the post-Soviet Union countries. This nation, as well as many other central Asian countries, is undergoing a radical transformation and change in education which encompasses the implementation of inclusive and special education. This book is composed of chapters synthesized from various studies and captures different aspects of the implementation of inclusive education in Kazakhstan. Each evidence-based study demonstrates the multifaceted nature of the process as part of realizing an educational system that is more inclusive. The book highlights some of the fundamental requirements and challenges for this process to succeed. Among the main issues addressed are the understanding of inclusive education, the transition towards inclusive education given the soviet legacy, the role of school leadership, teachers, parents and other stakeholders in the process. The findings in each chapter are the result of alumni research and demonstrate some of the milestones and challenges of inclusivity. This work will be of interest to academics, scholars, students and teachers in this field.



The book will be available shortly in hardcover and e-book versions through the Nazarbayev University Library.

Graduate School of Business

NEW BUSINESS DIGEST SERIES

January - March 2021

The Graduate School of Business has launched a new series on research briefings, *Business Digest.* The *Business Digest Series* reports short pieces on research from GSB faculty, highlighting the key take-aways and policy implications, relevant for the wider business community and policy makers (see LINK).

The first **Business Digest 2021/01 is by Joep Konings and co-authors**, which is looking at the impact of exchange rate fluctuations on prices of consumer goods. The authors make use of monthly scanner data covering more than 135,000 products sold by various retailers in Kazakhstan between January 2014 and December 2016. The study investigates whether prices rise faster than they fall and shows that they do indeed. When costs increase, retailers pass this partially on to consumers by increasing prices in their shops. When costs decrease, retailers tend *not* to lower the prices they charge, which implies the shops obtain larger margins. This insight matters for monetary policy concerned with inflation targeting, which is highly relevant in Kazakhstan.

The **second Business Digest 2021/02 is by Ona Akema and co-authors.** The authors analyze social enterprises as hybrid organizations. When employees identify with their organization's mission they are more likely to be motivated. Intractable identity-based conflict wastes management's attention and demotivates employees that are necessary to achieve a social enterprise's commercial and social goals. The study suggests that an organization identity that meaningfully engages both "idealistic" and "pragmatic" employees does not emerge willy-nilly; instead, it involves active identity work by leaders. Thus, leaders of social enterprises can build such an identity by tactfully silencing identity-based debates within the office, deferring the resolution of those debates to neutral location (e.g., an offsite meeting location), and ensuring maximum overlap between the company's commercial and social goals.

GSB RESEARCH SEMINAR SERIES

GSB has expanded its research seminar frequency to a weekly schedule in which fellow academics discuss and present their work. The seminar features speakers from NU, Kazakhstan, our strategic partner and other leading universities in the world. The research seminars are accessible by zoom every Wednesday at 6 PM. It is a unique opportunity to engage with top researchers from around the world. Anyone can attend by registering. In the past few weeks, the GSB research seminar series has seen an uptake in attendance from colleagues based in other Universities in Kazakhstan and elsewhere in the world. For registration and overview see on our research web page (LINK).

ACCEPTED AND FORTHCOMING PUBLICATIONS IN TOP PEER REVIEWED JOURNALS

In **2020** the Graduate School of Business experienced a top year in terms of research output, with **over 16 published articles** in renowned top peer reviewed journals, various book chapters and policy reports. And **2021** presents itself even better. The year has just started and already GSB faculty can claim ten accepted and forthcoming papers, listed below.

Ona Akemu

1. Building Character: The Formation of a Hybrid Organizational Identity in a Social Enterprise, *Journal of Management Studies* (5yr impact factor: 5.8)

Mayowa Babalola

2. Being Ignored by loved ones: Understanding when and why family ostracism inhibits creativity at work, *Journal of Organizational Behavior* (5yr impact factor: 5.0)

Doron Israeli:

3. Unexpected Distractions and Investor Attention to Corporate Announcements, *Review of Accounting Studies* (5 yr impact factor: 3.7)
4. Stock Price Management and Share Issuance: Evidence from Equity Warrants, *The Accounting Review* (5 yr impact factor: 5.8)
5. The Real Side of the High-Volume Return Premium, *Management Science* (5 yr impact factor: 5.5)

Joep Konings

6. The Return on Information Technology – Who Benefits Most? *Information Systems Research* (5 yr impact factor: 5.6)

Thierry Post

7. Nonparametric Tests for Optimal Predictive Ability, *International Journal of Forecasting* (5 yr impact factor: 3.96)
8. Risk Arbitrage Opportunities for Stock Index Options, *Operations Research* (5 yr impact factor: 1.7)
9. Stochastic Bounds for Reference Sets in Portfolio Analysis, *Management Science* (5 yr impact factor: 5.5)

Narendra Singh

10. Intertemporal Product Management with Strategic Consumers: The Value of Defective Product Returns, *Manufacturing & Service Operations Management* (5 yr impact factor: 4.09)

NUGSB – FUQUA BUSINESS SCHOOL SYMPOSIUM APRIL 22 – 23

The annual joint symposium with our strategic partner the Fuqua Graduate School of Business of Duke University will take place on line on April 22-23. This year the papers will cover various topics in the area of Economics, Finance and Accounting. Details of the program will be posted on the GSB web site shortly, where you also will be able to register for participation.

SHARED BY DR. JOEP KONINGS

BENFORD ANALYSIS OF KASE STOCK RETURNS

Authors: Aiyakez Akhmoldanova, Akmaral Aimukhamedova, Aidos Kanapyanov

All Master of Science in Finance (MSF) students with Graduate School of Business (GSB), Nazarbayev University. This work is a shortened and slightly adjusted version of 2021 MSF GSB master thesis, titled "Comparative Analysis of Benford's Law." We thank our supervisor, Michal Czerwonko for advice and encouragement. We thank National Analytical Center (NAC) for making KASE stock data available and Michal Czerwonko for putting the data into easily accessible format.

ABSTRACT

Benford's law (the Law) describes logarithmic distribution of the first significant digit of many numerical data sets. Its present applications chiefly correspond to fraud detection. Our study examines Kazakhstan Stock Exchange (KASE) stock-level and index data conformity to the Law and finds little evidence for securities fraud on this basis. Comparison with other developing markets and S&P 500 index is provided.

INTRODUCTION

Benford's law [1] (hereafter 'the Law') is an observation about the logarithmic frequency distribution of the first significant digit in many numerical data set, and it is mainly used for fraud detection. This note performs Benford's analysis of the first significant digit of the Kazakhstan Stock Exchange (KASE) stock and index returns and it is one of the first studies of the stock-level KASE data. We apply several goodness-of-fit (GOF) tests and Mean Absolute Deviation (MAD) as metrics of conformity to the Law. We show comparative results for several developing markets as well as for the S&P 500 index. We do not find any evidence for stock price manipulation in KASE on the basis of the Law. Further, KASE index returns exhibit favorable conformity to the Law in comparison to several other indices.

One of the early examples of applying the Law was provided in [2], where it was found that the insurance refund account of a medical did not comply with Benford's Law, and eventually revealed the fraud. This suggested Benford's analysis is a useful method for auditors. Recently, several studies apply this analysis to detect fraud in COVID reporting, e.g. [6].

The analysis performed in [4] provides evidence that the daily returns of the US stocks have a close fit to Benford's Law with some explainable deviations. Several studies applied Benford's analysis to developing countries stock data, e.g. to China [7] and to Turkey [3]. This last study revealed the two out of 27 national indices not conforming to the Law.

METHODOLOGY AND DATA

To derive the empirical measures of the conformity to the Law, we first find the first significant digit of a stock or index return in a given data set, which is followed by deriving the relative frequency of each digit. Finally, the empirical frequencies are compared to the theoretical ones of the logarithmic distribution by the statistical procedures described in the following paragraphs.

We apply the following GOF tests: Euclidean Distance (ED), Kolmogorov-Smirnov (KS) and Chebyshev distance (CD) and Empirical Likelihood Ratio Test (ELR). However, since it was revealed relatively early that widely used GOF tests over-reject the null hypothesis of conformity, generally due to a large number of observations. To overcome this shortcoming a descriptive statistical metric, Mean Absolute Deviation (MAD) was proposed in [5] and [4] by Nigrini together with a 'rule of thumb' to assess the conformity with the Law. MAD is defined as the average absolute deviation of each of the nine digits frequencies from the logarithmic ones. The rule of the thumb follows: close conformity MAD <= 0.006, acceptable conformity 0.006<MAD<=0.012, marginal conformity 0.012<MAD<=0.015, non conformity MAD>0.015.

For GOF tests, we have the following hypotheses: H0: Digits of data conform to Benford's expected frequency; Ha: Data doesn't conform to the Law.

We use daily and monthly stock return KASE data for the period between 2012 and 2018 for all 57 listed companies, which results in 17,349 (1,482) daily (monthly) return observations.

For the comparison developing markets, i.e. Argentina, Bangladesh, Brazil, Egypt, Malaysia, Russia and Thailand we obtain stock prices of all publicly traded companies from the COMPUSTAT database and convert them to daily and monthly returns. We provide the details on the number of observations in the following section we note, however, that KASE data results in the lowest number of observations. For comparison, for the country with the second lowest quantity of observations (Argentina) we have 87,081 (5,792) daily (monthly) observations.

For indices, we gather the closing prices of the KASE index from the KASE website and we focus on the same period as for stocks. For other markets, we search Yahoo! Finance data and obtain the indices for the following countries: Argentina, Brazil, Malaysia and Russia. For our period of study we have around 1,700 daily observations in dependence to the number of trading days in each country and 84 monthly observations. For the S&P 500 index, we gather daily data from the same source.

RESULTS

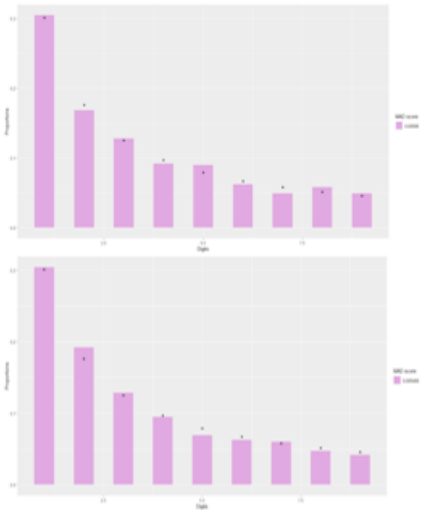
Table 1 below provides the results for KASE stocks of GOF tests and MAD values for the daily and monthly data. It displays the test statistics with the corresponding p-values, and MAD results are qualified in terms of conformity. The adjacent Figure 1 illustrates the observed and expected digit probabilities.

For daily data, all GOF tests exhibit very low p-values, which in principle strongly rejects the null. The MAD metric implies the opposite, i.e. a close conformity to the Law. For monthly data, both GOF tests and MAD imply the conformity. Given our earlier discussion of the over-rejection of GOF tests, we conclude little evidence for stock price manipulation on the basis of the law.

Table 1. GOF tests for conformity of the first significant digits of KASE stock returns to the Law and corresponding MAD scores. P-values are shown in italic font.

Tests	Daily	Monthly
Kolmogorov-Smirnov	2.982 *0.000*	0.399 *0.830*
Euclidean Distance	2.759 *0.000*	0.751 *0.677*
Chebyshev Distance	2.103 *0.000*	0.407 *0.789*
Empirical likelihood Ratio	69.286 *0.000*	7.395 *0.495*
MAD score	0.006 (close conformity)	0.006 (close conformity)

Figure 1. Actual vs Benford distributions of KASE stock returns on monthly basis (top) and daily basis (bottom). Dots represent Benford's Law.



To shorten the presentation for the comparative analysis with other developing markets, in what follows we present only the results for ELR test and MAD. Table 2 below displays the results for daily data with a part the results from Table 1 repeated for convenience. ELR test uniformly rejects the null with very low p-values for all eight countries. The results for MAD show close conformity to the Law for Kazakhstan, Bangladesh, Malaysia and Russia; Argentina, Brazil and Egypt display acceptable conformity, and Thailand displays non-conformity. For monthly data, for all countries except Kazakhstan ELR test rejects the null with very low p-values; however, the result for Kazakhstan may be plausibly explained by the relatively low number of observations. The results for monthly data for MAD are as follows. Close conformity: Kazakhstan, Brazil, Malaysia and Russia; acceptable conformity: Bangladesh, Egypt and Thailand; marginal conformity: Argentina. We observe relatively little change in the monthly results relative to the daily ones.

The Benford analysis for indices is presented only for daily data. The right hand panel of Table 2 displays the results. ELR test rejects the null for Kazakhstan only at the 10% significance level; for the remaining countries the null is rejected at the 1% level.

Last, for the S&P 500 index we observe an ELR test of 18.4 with the p-value of 0.02 and MAD score of 0.009, which implies acceptable conformity. These results for the highly developed market not to mention a large number of component stocks in the US index are surprisingly similar to the ones for the KASE index, which is composed of around ten stocks.

Table 2. Goodness-of-fit tests for conformity of first significant digits of daily and monthly stock and daily index returns to Benford's Law by each country, 2012-2018

	Daily stock returns			Monthly stock returns			Daily index returns			
Country	# obs.	ELR test	MAD	# obs.	ELR test	MAD	Index	# obs.	ELR test	MAD
Kazakhstan	17,349	69.3 *0.00*	0.005 *(close)*	1,482	7.4 *0.50*	0.006 *(close)*	KASE	1,717	14.6 *0.07*	0.008 *(accept.)*
Argentina	87,081	708.4 *0.00*	0.008 *(accept.)*	5,792	90.0 *0.00*	0.012 *(marg.)*	MERVAL	1,680	33.8 *0.00*	0.013 *(marg.)*
Bangladesh	349,611	469.5 *0.00*	0.003 *(close)*	23,787	152.6 *0.00*	0.008 *(accept.)*				
Brazil	549,300	2,607.2 *0.00*	0.007 *(accept.)*	27,593	70.9 *0.00*	0.005 *(close)*	Bovespa	1,715	54.1 *0.00*	0.016 *(non)*
Egypt	246,278	1,828.5 *0.00*	0.008 *(accept.)*	15,640	174.9 *0.00*	0.010 *(accept.)*				
Malaysia	967,576	4,316.0 *0.00*	0.006 *(close)*	75,899	133.5 *0.00*	0.005 *(close)*	FBM KLCI	1,698	21.8 *0.01*	0.012 *(marg.)*
Russia	459,369	1,301.8 *0.00*	0.006 *(close)*	19,234	22.7 *0.00*	0.004 *(close)*	MOEX	1,417	31.4 *0.00*	(0.015) *(marg.)*
Thailand	1,389,058	70,992.7 *0.00*	0.020 *(non)*	53,369	232.3 *0.00*	0.007 *(accept.)*				

CONCLUSIONS

Our study provides little evidence for securities fraud in KASE stocks on the basis of Benford's Law; and in fact shows closer conformity to this law than several other developing markets in spite of significantly lower number of observations for KASE data. Caution, however, should be applied to the conclusions. As much as a lack of conformity could imply securities fraud, observing conformity does not necessarily imply a lack of such fraud.

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The Center for Preparatory Studies

PROBLEMS EAL PROFESSIONALS FACE WHEN TEACHING ROMA TEENAGERS

By Justyna Duchowska

ABSTRACT

The aim of this study is to investigate the problems English as an Additional Language (EAL) professionals face when providing English support to Roma teenagers in secondary schools in Derby in North England. In addition, this study aims at finding out how intercultural awareness can help those professional overcome these potential issues. There is a limited research on Roma teenagers and English language learning. Thus, this may cause great difficulties to EAL professionals who offer English support to Roma students. Roma culture is very unique and shows many aspects which other societies may not relate to, for example social exclusion, Special Educational Needs, English as a second language and challenging behaviour. A potential solution to this problem may be intercultural awareness and its value in teaching minority groups. The method for this study is quantitative. The questionnaire of 16 questions with open, closed and rating scale questions along with an opportunity to add additional comments was used. The study highlights the factors of challenges and issues EAL professional face when teaching Roma teenagers, for example low ability and level of literacy skills, behavioural issues and poor attendance. The study confirms that intercultural awareness can help when providing English support to Roma teenagers. In addition, the study highlights the importance of trainings and workshops.

Key words: second language acquisition, culture, intercultural awareness, education, English language teaching

INTRODUCTION

A significant amount of research has been undertaken on Roma, Gypsies and Travellers considering education, aspects such as social exclusion, achievement, behavioural issues and culture. However, it is believed that not enough research has been done regarding this minority group which has settled in the United Kingdom. English language professionals should be equipped in knowledge and strategies regarding the support of English as a second language effectively. They should be aware of students coming from different and culturally diverse environments. Finding straight forward strategies on how to teach English as a second language to Roma teenagers appears to be a challenge. Some of those learners may have never been to school before; they may have different values and beliefs about education and some others may have no motivation in learning English.

The aim of this study is to investigate what problems EAL support professionals face when teaching a minority group of Roma teenagers in secondary schools and how intercultural awareness can help them overcome these identified issues.

REVIEW OF THE LITERATURE

According to Cemlyn and Clark (n.d.) Gypsies and Travellers have been in Britain for at least 500 years. As Lloyd and McCluckey (2008) suggest, there are different groups that fit under one term of Gypsies and Travellers such as English Gypsies and Travellers, Romanichal, Irish Travellers, Scottish

Gypsies and Travellers, Welsh Kale and European Roma. This study concentrates on European Roma coming mainly from Czech Republic, Poland, Slovakia, Hungary, Romania and Bulgaria. According to Fremlova and Anstead (2010-2011) the majority of Eastern European Roma migrated to the UK in the 1990's to seek freedom and escape racism against them. Fremlova and Anstead (2010-2011) suggest, the minority of Roma population settled down in the East Midlands, Kent and London. In addition, there are Roma communities in Scotland, Wales and Northern Ireland.

There are some key features this group represents. According to Drakakis-Smith (2007) the Roma minority group may lead a nomadic lifestyle. As Cemlyn and Clark (n.d.) suggest, the group is family orientated and also has strong and at the same time different values and authorities at home rather than at school. Experience of financial poverty may make them more socially excluded from the majority of the society. According to Lloyd and McCluskey (2008) they are more likely to pass their low skills or occupations from generation to generation. Consequently, they may not be interested in learning new skills provided by education system or learn English to improve their potential. Being provided with skills and occupations by their relatives, they tend to mix only with people of the same ethnic background. Thus, this may also suggest they exclude themselves from interacting with wider society.

It may be often the case that secondary Roma pupils go to school for the first time in their teenage age so it makes it more difficult for teachers to plan lessons. Roma students may often struggle with writing and reading as there is no such academic culture of learning for them. They seem to communicate better in spoken language with support of visual objects.

This review has sought to establish the potential problems EAL support professionals face when supporting English learning of Roma teenagers. It was found that Roma culture is very unique and the professionals may experience issues such as, for example, social exclusion, behavioural issues and low-level ability skills. It was also found that there are as well different values to Roma learning processes.

Moving further the term 'culture' needs to be explained. According to Cortazzi and Jin (1997, cited in McNamara and Harris, 1997) culture can be divided into three subcultures such as Academic Culture, Culture of Communication and Culture of Learning. It is worth considering all three when it comes to providing English support to minority ethnic groups. Culture is strongly connected with intercultural awareness; thus, it is crucial for EAL professionals to understand and appreciate different cultures represented by their learners in order to make intercultural communication easier (Gillett, 1997, Holiday et al. 2010). The Acculturation Model introduced by Schumann in 1978 is crucial for EAP professionals. They have to be aware of culture changes learners may go through when learning a second language (L2).

METHODOLOGY

The study consisted of both quantitative and qualitative methods. The questionnaire consisted of 16 open, closed and rating scale questions. In addition, because there were open questions included it can be said the data was also qualitative. Although there are other ways of collecting data, they were rejected due to this research to be taking place within only three months, therefore there was not enough time to carry, for example the interviews.

There were thirty questionnaires sent out or handed in to participants. There were nice 'White British' participants and four 'White Other' respondents who had various years of experience of providing English support to Roma teenagers. Five participants had from 0-2 years of experience, four participants had from 2-4 years of experience and finally the last four respondents had between 4 and 6 years of experience.

RESULTS

100% of participants answered that they are aware of the term 'Gypsies and Travellers'; everybody was aware of the term 'Roma'. Moreover, 100% EAL support professionals answered that they are aware of similarities between 'Roma' and 'Gypsies and Travellers' groups. However, when it comes to the differences between these groups the answers varied. Hence, 62% gave a positive answer to the question, so they are aware of these differences; nevertheless, 38% said they are not aware of any differences between these two minority groups.

77% were aware of the cultural awareness between these two groups; however, 23% indicated that they are not aware of these differences. 31% respondents mentioned a different attitude towards education and its value; 30% indicated a first difference of traditional culture and another 30% said there are differences in attitudes to relationships and 9% indicated Roma's very positive attitude towards music and dance.

85% of participants were aware of the term 'social exclusion', but surprisingly 15% were not. 85% said that they noticed forms of social exclusion in schools they work in; however, 15% have not noticed any forms of social exclusion in their schools.

36% identified both attendance and behavioural issues as problems they often face when supporting EAL to Roma teenagers. 12% identified value of education as a common problem Roma teenagers show. 4% of participants indicated other problems such as Roma teenagers being uncomfortable with a school's and/or lesson's structure, language barrier, low ability and financial situation. What is more, 100% indicated low literacy skills in their first language (L1) as well as the same problems, as the outcome of L1, in their second language (L2).

Regarding the methods and strategies when providing English support, 15% of EAL professionals used games as one of the most popular strategies. 10% of participants used drama and role play with their learners and another 10% used flash cards and visuals. Participants also mentioned using debates, brainstorming, pictures, films, repetition, toys and internet. Significantly, only 5% of respondents mentioned the Presentation, Practice and Production (PPP) method.

46% of respondents rated the effectiveness in methods using as 4 on a 5-point scale; 1 meaning 'not effective' and 5 meaning 'very effective. Moreover, 23% participants rated it as 3 and another 23% as 2. Finally, 8% said the use of methods is not effective, which left them with 1 on a 5-point scale measurement. However, from the gathered questionnaires, it was observed that 1 participant out of 13 made additional comments that the effectiveness of methods as well as strategies really depends on an individual's ability and willingness.

Regarding the effectiveness of strategies, it is seen that 38% rated their answer as 4, another 38% as 3, 15% as 2 and only 9% rated as 1. In addition, 23% of respondents stated they were provided with very limited training. 77% of participants indicated that they were not provided with any training that could help them to approach this group of learners. What is more, 92% agreed that intercultural awareness can help them when providing EAL support to Roma learners; however, 8% stated that they do not believe this can help them.

Some participants spoke about their experiences in the open questions from the questionnaire.

'Supporting these students can be very challenging at times. Due to the inconsistent attendance of some of them, a lot of learning opportunities get missed and the continuity of support is lost. Unfortunately, very often, their frustrations of lack of understanding manifest themselves as bad behaviour. Sustaining the motivation of such learners is in my opinion the greatest challenge facing the professionals supporting this group of EAL learners'.

'I have observed that Roma teenagers struggle with autonomous learning and hardly depend on teachers and TAs support… gaps in education and low ability skills, especially literacy and numeracy skills, are the outcomes of not being able to learn independently. The lack of skills in comparison with their peers often causes low self-esteem which also impacts on their difficulties with autonomous learning'.

The participants spoke about experiencing issues with behaviour, attendance and motivation when providing EAL support for Roma learners. In addition, it was suggested the problems of EAL support staff are related to Roma teenagers' low literacy skills, autonomous learning as well as self-esteem and confidence of these learners.

ANALYSIS AND DISCUSSION

36% of EAL professionals identified attendance problems and behavior management issues as two of the most common issues they face in secondary schools. According to Derrington (2005) irregular attendance of these students may cause serious problems in relation to their achievement, relationship with others and sense of belonging to a school.

Surprisingly 4% of participants identified low ability (low literacy skills in L1 and L2 and language barrier) as one of the issues they face. This could be explained by Lloyd and McCluskey (2008), who suggested that Roma are more likely to pass their low skills or occupations from generation to generation. Consequently, if this happens, they may not want to learn new skills provided by education system or simply learn English to improve their potentials. It has been observed that Roma students may often struggle with reading and writing as there is no such culture of learning for them. When the participants were asked about what academic problems they recognize when providing EAL support 100% indicated low literacy skills in their L1 and L2.

From the questionnaire it was established that EAL teaching staff are using different methods and approaches to their teaching. These findings are supported by Scrivener (2011) who affirmed that teachers seem not to have one favorite method and/or approach of their own. That should be due to learners' ability, cultural background and learning styles.

The most common answer to the question on usage of methods and strategies in ELT to Roma teenagers was using games (15% of participants). As Scrivener (2011) suggests the use of games can have a wide application not only with small groups, but also as pair work. Only 5% of respondents mentioned debates as a teaching tool. Group work and peer learning were mentioned by again only 5% of participants. This may indicate how difficult it is to apply strategies and/or techniques according to learners' culture and ethnic background.

10% of participants use drama and role play with these particular learners and others use flash cards, music and visual materials. As Scrivener (2011) suggests when EAL teachers use flash cards, learners can visualize the images or words and hopefully remember them better. Drama, music and visuals may be very popular when working with Roma learners as these factors are shared with their culture.

The majority of participants, 77%, stated that they are aware of the differences these learners may have. However, 23% of respondents were still not aware of these differences.

Finally, majority of respondents, 92%, agreed that intercultural awareness can help professionals when providing English support to Roma students. Culture is strongly connected with intercultural awareness; thus, it is crucial for EAL professionals to understand and appreciate different cultures presented by their learners in order to make intercultural communication easier for both professionals and learners (Gillett, 1997; Holliday et al, 2012).

Theme 1 – low ability and low literacy skills

It is clearly seen that 100% agreed on Roma learners having low ability and literacy skills which often happen in both L1 and L2 due to their lack of education in home countries. Low ability leads to not being able to learn independently by these students. As mentioned, Roma learners lack literacy and numeracy skills and may have difficulties with autonomous learning. As Smith (1997) suggests, Roma students may often struggle with reading and writing as there is no such culture of learning and communication for them.

Theme 2 – challenging behavior and attendance issues

The study found that 36% of participants pointed out the attendance as one of two main issues they face. The second problem was behavior issues and that was pointed out by another 36% of respondents. Attendance issues might be related to gender differences where girls are often asked by their parents to babysit younger siblings. Moreover, behavioral issues may link to more freedom being allowed at home by parents and as a consequence lack of respect and authority in a school (Darrington, 2005; Cemlyn et al. 2009).

Theme 3 – motivation

Motivation of Roma learners was mentioned by one participant in their additional comments. Nevertheless, it is a valuable point to be mentioned. Motivation of these learners might be affected due to different factors, for example cultural differences that involve different values, family commitments and needs.

CONCLUSION AND RECOMMENDATIONS

Significant problems EAL professionals face when teaching Roma teenagers in secondary schools were identified. Almost 100% of participants agreed that intercultural awareness can help when

teaching minority groups, in this case Roma learners. There were four objectives formulated before the study was conducted namely:

1. To investigate what teaching methods these professionals use and if they are effective.
2. To investigate if these professionals are aware of cultural differences learners may have.
3. To find out if these professionals were provided with any training that may have helped them to deal with this particular group of students.
4. To investigate whether intercultural awareness can help when teaching this particular minority group of learners.

EAL professionals face many challenging issues related to both academic and non-academic factors. Attendance and behavioral issues were the major problems EAL teaching staff face. Due to inconsistent attendance, a lot of learning opportunities can be missed and the continuity of EAL support may be lost. Behavioral issues may have a significant influence on students' learning processes. Challenging behavior may exclude them from school life which again leads to an interrupted continuity of EAL support.

One of the main solutions and recommendations would be provision of a training and/or workshop so EAL professionals, other teaching staff and all students in a school could benefit from that. Roma Support Group, according to their web site (2012) has been empowering Roma communities since 1998. This group offers both trainings and workshops. One of the trainings they deliver is training for those who work in education.

In addition, schools should engage parents in everyday life and events so that parents could get that identity of belonging to a wider community. It is important that parents of Roma teenagers are offered some support courses such as English for Speakers of Other Languages (ESOL) so they value the language learning first and they can pass this value to their children.

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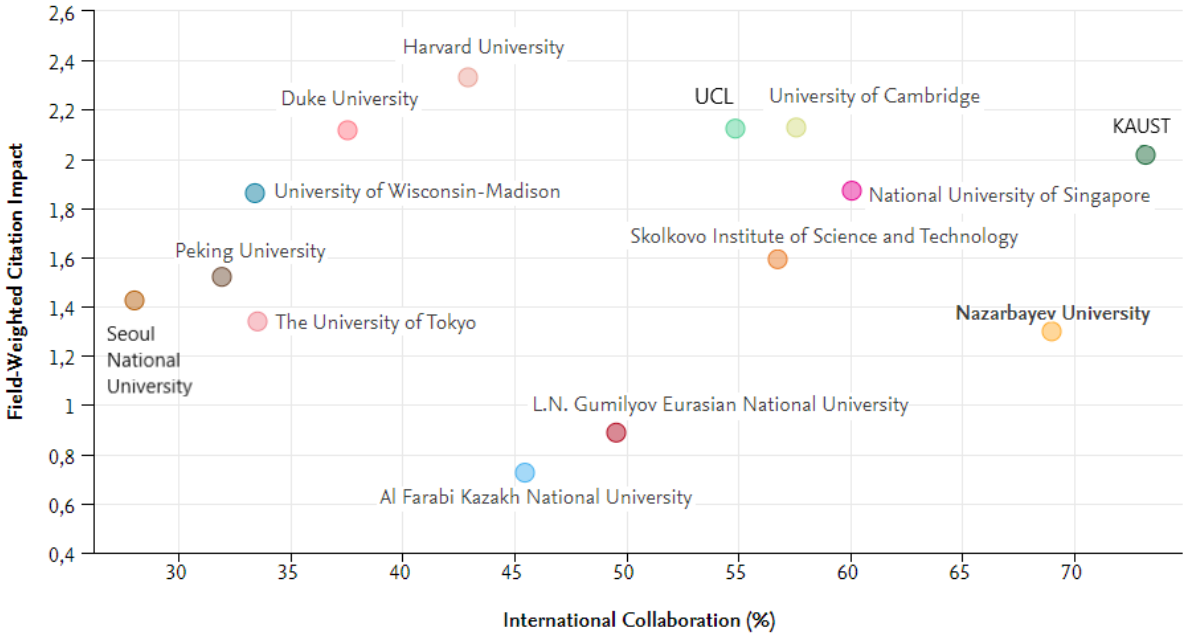
RESEARCH PERFORMANCE EVALUATION USING SCIVAL



In this issue, we are delighted to present you an overview of research activities conducted under the auspices of Nazarbayev University.

Since its inception in 2011, Nazarbayev University faculty members and researchers have released 4,623 peer-reviewed publications indexed by Scopus, and have been cited 30,375 times for 2011-2021 period (Source: Scopus, March 2021). The approximate number of citations per peer-reviewed publication is 6.6. The overall H-index of NU is 56, whereas H5-index is 31. The field-weighted citation impact is 1.31, meaning that our publications have been cited 31% more than would be expected based on the world average for similar publications.

For getting more comprehensive information on the research performance at NU, please have a look at the following presentation prepared using SciVal research evaluation platform.

If you have any questions regarding the provided information, please contact Saule Sadykova (ssadykova@nu.edu.kz)

FUNDING OPPORTUNITIES

#	Opportunity	Funder	Deadline	Source link
1	DRL Support for Freedom of Association in Kazakhstan	BUREAU OF DEMOCRACY, HUMAN RIGHTS, AND LABOR, USA	28.03.2021	URL
2	Dissertation Research Grant in Women and Gender Studies	Association for Slavic, East European, and Eurasian Studies	01.04.2021	URL
3	ASEEES DISSERTATION RESEARCH GRANT PROGRAM	Association for Slavic, East European, and Eurasian Studies	01.04.2021	URL
4	2021 Call for Applications	James S. McDonnell Foundation	09.04.2021	URL
5	Laval Virtual Awards&ReVolution Virtual Competition 2021	Laval Virtual Europe	14.04.2021	URL
6	Annual Program Statement for Cultural Affairs	U.S. Embassy	15.04.2021	URL
7	Annual Program Statement for Cultural Affairs	Cultural Affairs	15.04.2021	URL
8	Silk Roads Youth Research Grant	UNESCO	18.04.2021	URL
9	ERC CONSOLIDATOR GRANTS	Horizon Europe (HORIZON)	20.04.2021	URL
10	Cancer Grand Challenges 2021	Cancer Research UK and the US National Cancer Institute	22.04.2021	URL
11	Program target funding	MES	26.04.2021	URL
12	Cyber Violence Against Women	European Institute for Gender Equality	27.04.2021	URL
13	AI4EU Call for Solutions (Third Parties Call)	EU	29.04.2021	URL
14	Kazakhstan Human Rights Activity	United States Agency for International Development	29.04.2021	URL
15	REGIONAL SCHOLAR TRAVEL GRANT	Association for Slavic, East European, and Eurasian Studies	29.04.2021	URL
16	U.S. Embassy Small Grants Program 2021 (SGP)	U.S. Embassy	30.04.2021	URL
17	U.S. Embassy Small Grants Program 2021	U.S. Department of State	30.04.2021	URL
18	Collaborative Project to Enhance Transformation and Value Creation in the Building, Construction and Real Estate Industry	The Research Council of Norway	12.05.2021	URL
19	Program target funding	MES RK	15.05.2021	URL
20	Oncology Nursing Foundation - Nurse scientist focused grant opportunities	Oncology Nursing Foundation	17.05.2021	URL
21	NIHR Global Health Research Groups (research and innovation)	Foreign, Commonwealth and Development Office	18.05.2021	URL
22	NIHR Global Health Research Units (research and innovation)	Foreign, Commonwealth and Development Office	18.05.2021	URL
23	DRL Support for Freedom of Association in Kazakhstan	U.S. Department of State	28.05.2021	URL

FUNDING OPPORTUNITIES

#	Opportunity	Funder	Deadline	Source link
24	Research Grants on Education: Small	Spencer Foundation	01.06.2021	URL
25	The Small Research Grants on Education Program	Spencer foundation	01.06.2021	URL
26	General Research Grants: Projects	Gerda Henkel Fund	02.06.2021	URL
27	Cancer Prevention, Detection, Diagnosis, and Treatment Technologies for Global Health (U01 Clinical Trial Optional)	NIH	03.06.2021	URL
28	International Research Ethics Education and Curriculum Development Award (R25 Clinical Trial Not Allowed)	National Institutes of Health	04.06.2021	URL
29	MIF Research Fellowship Program	Matsumae International Foundation	30.06.2021	URL
30	Annual Program Statement for Cultural Affairs	U.S. Department of State	15.07.2021	URL
31	The European Capital of Innovation Awards (iCapital) (HORIZON-EIC-2021-iCapitalPrize)	Horizon Europe Framework Programme (HORIZON)	15.07.2021	URL
32	2021 Research Grants, Merck	Merck	31.08.2021	URL
33	MRC molecular and cellular medicine partnership grant: Sep 2021	Medical Research Council (MRC)	01.09.2021	URL
34	Research-Practice Partnerships: Collaborative research for educational change	Spencer Foundation	15.09.2021	URL
35	South and Central Asia Regional Research Program	Fulbright Association	15.09.2021	URL
36	Multiple Disciplines	Fulbright Association	15.09.2021	URL
37	MRC neurosciences and mental health programme grant: Sep 2021	Medical Research Council (MRC)	29.09.2021	URL
38	EIC Accelerator Challenges 2021 (HORIZON-EIC-2021-ACCELERATORCHALLENGES-01)	Horizon Europe Framework Programme (HORIZON)	06.10.2021	URL
39	Collaborative Research	National Endowment for the Humanities	01.12.2021	URL
40	Research-Practice Partnerships: Collaborative research for educational change	Spencer foundation	08.12.2021	URL
41	Global Infectious Disease Research Training Program (D43 Clinical Trial Optional)	National Institutes of Health	03.08.2023	URL
42	Between Europe and the Orient – A Focus on Research and Higher Education in/on Central Asia and the Caucasus	Volkswagen Foundation	No Deadline	URL
43	2021 Research Challenges, Merck	Merck	No Deadline	URL
44	Innovation Cup	Merck	No Deadline	URL

FUNDING OPPORTUNITIES

#	Opportunity	Funder	Deadline	Source link
45	UKRI-SBE Lead Agency Opportunity	The Arts and Humanities Research Council and the Social, Behavioral and Economic Sciences Directorate (SBE) of the US National Science Foundation (NSF)	No Deadline	URL
46	Between Europe and the Orient – A Focus on Research and Higher Education in/on Central Asia and the Caucasus	Volkswagen Foundation	No Deadline	URL
47	Kazakhstan Rule of Law project	United States Agency for International Development	No Deadline	URL
48	GoodAI Grants	Good AI	No Deadline	URL
49	LILA AND MURRAY GRUBER MEMORIAL CANCER RESEARCH AWARD AND LECTURESHIP	American Academy of Dermatology Association	No Deadline	URL

New research publications indexed by Scopus (count: 277)

- Abbas, A. H., Elhag, H. H., Sulaiman, W. R. W., Gbadamosi, A., Pourafshary, P., Ebrahimi, S. S., . . . Agi, A. (2021). Modelling of continuous surfactant flooding application for marginal oilfields: A case study of bentiu reservoir. Journal of Petroleum Exploration and Production Technology, doi:10.1007/s13202-020-01077-y
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