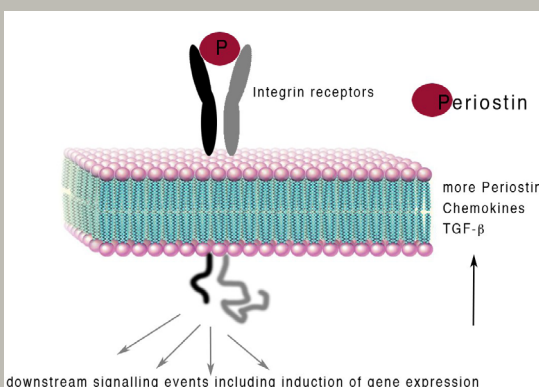
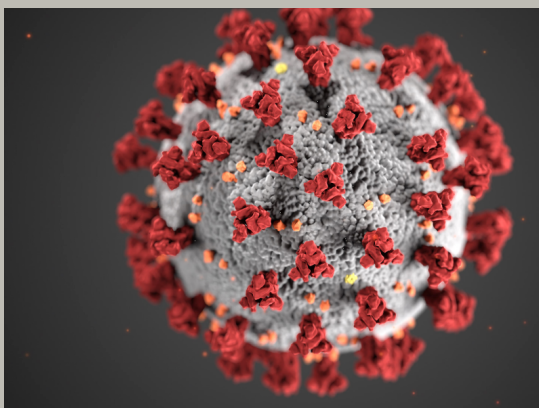




# RESEARCH NEWSLETTER

OFFICE OF THE PROVOST - RESEARCH ADMINISTRATION  
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# School of Medicine

## News

### **ERASMUS+ CAPACITY BUILDING IN HIGHER EDUCATION GRANT ACCELERATING MASTER AND PHD LEVEL NURSING EDUCATION**

*PREPARED BY PAOLO COLET, NANCY STITT, MASSIMO PIGNATELLI*

The NUSOM Nursing Faculty continue to advance the agenda of nursing research and to modernize the nursing profession and nursing higher education in Kazakhstan. With the successful implementation and completion of the [“Promoting the Innovation Capacity of Higher Education in Nursing during Health Services Transition” \(ProInCa\) project](#) (2017-2021), where the university served as a country coordinator, NUSOM, once again is collaborating on another international research project.



Together with Kazakhstani and European universities, NUSOM co-developed a country-wide research project proposal entitled Accelerating Master and PhD Level Nursing Education Development in the Higher Education System in Kazakhstan (AccelEd) for 2020 to 2023 through a Capacity Building in Higher Education (CBHE) Erasmus+ grant, for which the project received a grant amounting to € 999 764.

The overall goal of AccelEd (2021) is to:

Strengthen nursing education on Master level and establishing and launching PhD nursing science in Kazakhstan through changes in policy, legal framework, and institutional structures, involving ministries, universities, healthcare institutions, associations (both in healthcare and education), and international nursing communities. Specifically, five overarching objectives are in place to achieve this goal:

1. To strengthen nursing science in Kazakhstan through the capacity building of teaching staff based on contemporary issues in global nursing.
2. To build the capacity of nursing faculty in nursing research methodologies by joining to a broader international community of nursing researchers.
3. To create sustainable structures and systematic processes for cooperation on nursing research between medical universities and healthcare institutions in order to foster evidence-based nursing.
4. To initiate structural and institutional changes in managing Master and PhD level nursing education and quality assurance of post-graduate education in nursing adapting to best European practices.
5. To strengthen the role of nurses in the healthcare system of Kazakhstan and promote the development of nursing science and research on PhD and higher levels.

To highlight the second objective, NUSOM is serving as a co-leader with Lithuania University of Health Sciences (LSMU) on advancing research methodology, which focuses on building the capacities of teachers in nursing at master's and doctorate levels.

The other Kazakh-EU university partnerships in AccelEd are:

- Astana Medical University and Åbo Akademi University (Finland)
- Karaganda Medical University and JAMK University of Applied Sciences (Finland)
- Kazakh National Medical University and Utrecht University Medical Centre (Netherlands)

The project is in its first year and several activities have already been conducted such as a January 2021 kick-off meeting, systematic review training with Joanna Briggs Institute along with series of masterclasses addressing benchmarking best practices with clinical and educational collaboration, best practices in thesis or dissertation committee and management, and development of an advanced qualitative research methodology course. Further information about this project can be found at <https://project-aceled.com/>.

The Nursing Education faculty at NUSOM have had prior experience within the Erasmus+ CBHE funded projects. Prior to AccelEd, the ProInCa research project at its completion, was assessed and reviewed by the European Education and Culture Executive Agency (EACEA) in August 2021. ProInCa was awarded the highest rating, "very good," on implementation and achieving its goals.

#### REFERENCE:

AccelEd. (2021). What is AccelEd? Retrieved from <https://project-aceled.com/>

## CCR5: A RECEPTOR AT THE CENTER STAGE IN INFECTION



Following the invitation by *Frontiers in Immunology* (Impact Factor 7.6; Q1 Immunology; Q1 Immunology and Allergy) to launch a Research Topic as Guest Editor, Dr. Luca Vangelista (Associate Professor and Director of the Master in Molecular Medicine at NUSOM) accepted the task and assembled the Research Topic "*CCR5: a Receptor at the Center Stage in Infection*". In concert with Frontiers editorial office, Dr. Vangelista invited three more Guest Editors to manage the Research Topic. The initial contact by Frontiers in Immunology was a follow up to the success of a Mini Review (free full text download available [here](#)) published by Dr. Vangelista and Dr. Sandro Vento (a former colleague at NUSOM) on the importance of CCR5 for a wealth of pathological conditions (the paper ranks top 3% of Frontiers in Immunology for views and downloads and top 6% for citations, including papers published in top tier journals such as Science, Nature Immunology, EMBO Journal and Cancer Research). Frontiers encouraged Dr. Vangelista to cover a topic inherent to CCR5 impact on disease, hence Dr. Vangelista opted for the relevance of this receptor in infection. Presently, the Research Topic has one published article on machine learning prediction of COVID-19 severity with CCR5 as an important predictive biomarker, one manuscript being evaluated and 11 more manuscripts expected for submission. Dr. Vangelista is also assembling a manuscript for submission to the Research Topic. The Research Topic can be visited via the following [link](#).

# ONCOGENIC HPV STRAINS FOR CERVICAL CANCER PREVENTION



Assistant Professor Gulzhanat Aimagambetova and her research team are working on the project “A molecular epidemiological study to determine the prevalence of oncogenic HPV strains for cervical cancer prevention in Kazakhstan” (110119FD4528, 2019-2021).

This is the first study to explore the prevalence of high-risk human papillomavirus (HPV) genotypes causing cervical cancer in the regions across Kazakhstan. In a light of the WHO strategy on cervical cancer elimination by 2050, this is an important step for Kazakhstani healthcare system as the cervical cancer incidence is growing during the period of 2009-2018. It may contribute to the improvement of the national cervical cancer screening program and help on the way of implementation of the national HPV vaccination strategy. The work results were recently published in Q1 journals:

1. Aimagambetova G, Babi A, Issanov A, et al. The Distribution and Prevalence of High-Risk HPV Genotypes Other than HPV-16 and HPV-18 among Women Attending Gynecologists' Offices in Kazakhstan. *Biology* (Basel). 2021;10(8):794. doi:10.3390/biology10080794
2. Babi A, Issa T, Issanov A, et al. Prevalence of high-risk human papillomavirus infection among Kazakhstani women attending gynecological outpatient clinics. *Int J Infect Dis*. 2021;109:8-16. doi:10.1016/j.ijid.2021.06.006.



## EVALUATING THE EFFECTIVENESS OF PUBLIC HEALTH POLICIES IN ABSENCE OF EXPERIMENTAL DATA: AN APPLICATION OF “INTERRUPTED TIME SERIES” TO ASSESS THE IMPACT OF A NATIONAL PUBLIC HEALTH STRATEGY

Evaluating the impact of public policies is essential for accountability, to characterize the adequacy of the proposals and their achievement of the stated objectives. The usual designs for assessing the efficacy of clinical interventions, such as clinical trials, cannot typically be applied to evaluate the impact of public policies. Evaluating the effectiveness of public policies implies a counterfactual analysis to determine if the observed changes are due to the implementation of those policies: comparing what happened with what would have happened in the absence of the intervention, considering that an experimental design, in these cases, would be unfeasible or unethical.

Interrupted time series (ITS) analysis has been proposed as a robust design to evaluate the impact of interventions when their implementation occurs at a concrete moment in time. For this, it is necessary to have the observed data of the variable of interest during a period (time series) that includes measurements both before and after the application of the intervention, which is the moment of interruption of the series. The effects of the intervention are assessed by changes in the level and slope of the time series, as well as by the statistical significance of the different model parameters. Diabetes Mellitus (DM) is a disease characterized by elevated plasma glucose

levels due to a deficit in insulin production, a failure in its action, or a mixture of both. Patients with DM present with vascular alterations as a consequence of sustained hyperglycemia. Dysregulation in lipid metabolism, arterial hypertension, atherosclerosis, and other factors such as age or male sex also contribute to the 2-4 times increase in the cardiovascular risk of these patients which implies increased risk of stroke, acute coronary events, and lower-limb amputations.

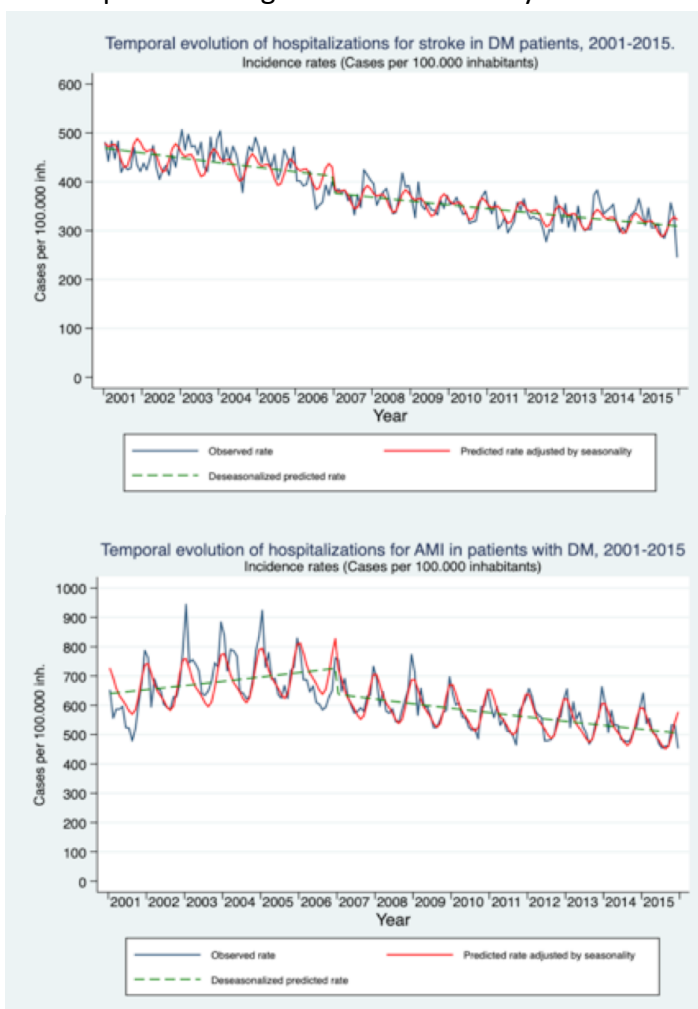
This excess risk represents reduced quality and length of life of patients with DM and are responsible for enormous direct and indirect costs.

Although a large body of evidence has shown the efficacy of several treatments and practices to reduce this burden a marked variability has been documented in its implementation, indicating a substandard level of DM care currently delivered. This situation has led to the need to develop interventions and policies to improve the care in DM.

The Spanish Ministry of Health approved in 2006 the Strategy for Diabetes Mellitus of the National Health System (SDM-NHS) as part of the Quality Plan for the National Health System. In line with scientific evidence and international standards, the SDM-NHS proposed to strengthen cardiovascular risk management as a critical component of DM management. This implies the assessment of long-term indicators, including hospitalization from stroke, myocardial infarctions, or amputations, to evaluate DM quality improvement strategies.

An ITS study was performed with a segmented regression analysis to identify the structural changes of the time series and the associated relative risks (RR) to compare trends in hospitalizations in DM patients for the following 3 dependent variables (Yt), before and after the approval of the SDM-NHS :

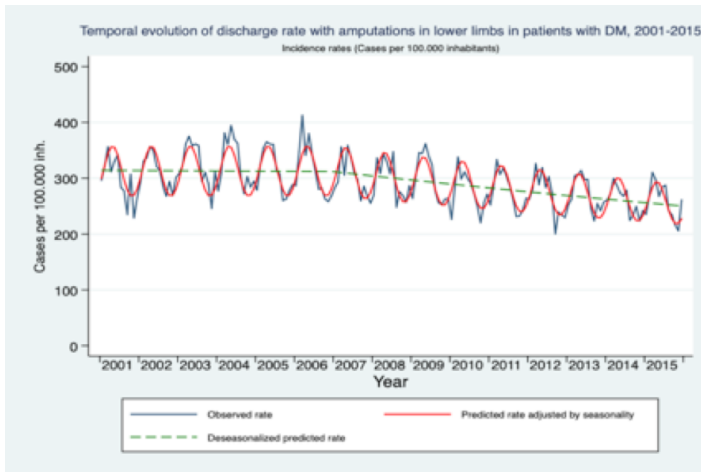
- Hospital discharge rates of amputations in lower limbs (LLA).
- Hospital discharge rates for stroke.
- Hospital discharge rates for acute myocardial infarction (AMI).



As the SDM-NHS was approved in 2006, the study period selected was 2001-2015. Data were examined to identify possible underlying trends, their stability over time and the existence of seasonality, performing a descriptive pre-strategy (2001-2006) and post-strategy (2007-2015) analysis specifically for each of the indicators analyzed. Subsequently, the general model of segmented regression was proposed for a change in slope and level in each result variable, defined by the following formula:

$$Y_t = \beta_0 + \beta_1 \cdot n_1 + \beta_2 \cdot \text{intervt} + \beta_3 \cdot (n_1 - \text{intervt})$$

where,  $\beta_0$  represents the baseline value when  $n_1=0$ ;  $\beta_1$  represents the change in the dependent variable for each increase of 1 unit in  $n_1$  (i.e. the trend or slope previous to the intervention);  $\beta_2$  represents the change of level in the period of time immediately after the and  $\beta_3$  represents the change in trend (slope) after the intervention (i.e. the difference in the slope pre and post-intervention).



In case of a model with only change in slope, the variable *intervt* was excluded, while for models of change on level, the (*n1· intervt*) was excluded. These situations were explored for each of the 3 dependent variables (the previously mentioned indicators). Autocorrelation, that is, the independence between the observations, was controlled by including seasonality in the models (sines and Fourier cosines) and through the graph of the residuals and the partial autocorrelation function. Over-dispersion

was evaluated to determine in each case the use of Poisson or Negative Binomial models. The findings of this work indicate a substantial and favorable evolution of the incidence of chronic macrovascular complications after the approval of the SDM-NHS. There was an immediate change in the level of the trend in the stroke hospitalizations rate (previously already decreasing), a change both in the trend as in the level of the same in the rate of hospitalizations for AMI and a change in the trend of LLA, which becomes descending after the approval of the SDM-NHS.

The major criticisms of ITS is that it presents limitations regarding internal validity. Nevertheless, typical threats to internal validity, like maturation (given that the data were adjusted) or testing, would probably not have any effect in this case. However, the possible influence of events that occur simultaneously in time or the effects associated with changes in the data collection could not be ruled out.

Although the observational nature of this study does not permit attributing those reductions to the implementation of the SDM-NHS and investigation with more granular data may be required to offer adequate healthcare standards all over the course of the disease, ITS analysis has proven to be a suitable instrument for the evaluation of public policies in complex interventions like the SDM-NHS when experimental studies are not feasible.

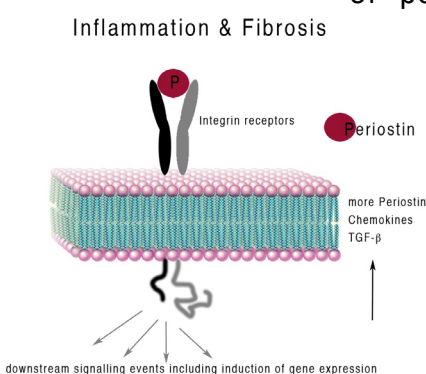
González-Touya M, Carmona R, Sarría-Santamera A. Evaluating the Impact of the Diabetes Mellitus Strategy for the National Health System: An Interrupted Time Series Analysis. *Healthcare (Basel)*. 2021 Jul 12;9(7):873. doi: 10.3390/healthcare9070873



## PERIOSTIN IN ALLERGY AND INFLAMMATION

In a recent review by Assistant Professor Eva Riethmacher published in a Q1 journal she and her colleagues have been focusing on the function of periostin in allergy and inflammation, specifically taking into account the isoforms identified so far. Periostin is a matricellular protein that has several documented and multi-faceted roles in health and disease. The involvement of periostin has been well described across a spectrum of allergic, inflammatory and fibrotic conditions including inflammatory conditions of the respiratory tract (asthma, chronic obstructive pulmonary disease, allergic rhinitis, idiopathic pulmonary fibrosis), systemic sclerosis and scleroderma, atherosclerosis, fibrosis, renal interstitial fibrosis, hepatic fibrosis, inflammatory bowel disease and others.

E. Sonnenberg-Riethmacher, M. Miehe and D. Riethmacher: Periostin in Allergy and Inflammation. *Frontiers in Immunology*, 12(3448) (2021) doi:10.3389/fimmu.2021.722170





# Graduate School of Public Policy News

## **REVISITED TO THE COVID19 AND AGILE GOVERNMENTS: COMPARISON OF TAIWAN, SOUTH KOREA, SINGAPORE AND HONG KONG**

*Eduardo Araral<sup>1</sup> Hyesong Ha<sup>2</sup> Alfred M. Wu<sup>1</sup>*

### **ABSTRACT**

We describe how Taiwan, S. Korea, Singapore and Hong Kong have so far controlled the spread of COVID-19 compared to other countries. We argue that their agile governments are central to their containments and mitigating negative economic impacts. We attribute their agility to their experience with similar epidemics, as well as their capacities to deploy digital, behavioral, organizational, legal, political and financial solutions. Outcomes are uncertain but agility and capacity will be the key.

### **LESSONS FOR PRACTITIONERS**

- Describes how Taiwan, S. Korea, Singapore and Hong Kong have so far controlled the spread of covid-19 compared to other countries
- Shows how agility of governments in these tiger economies is central to covid-19 control and mitigating its economic aftermath
- Attributes agility to their experience with epidemics and capacities to deploy digital, behavioral, organizational, legal, political and financial solutions.

**Keywords:** agile government, crisis, COVID-19, Singapore, Taiwan, S. Korea, Hong Kong

### **INTRODUCTION**

The performance of Taiwan, South Korea, Singapore and Hong Kong in controlling the spread of COVID-19 are well known. These tiger economies acted quickly and aggressively to deploy massive contact tracing, testing and isolation measures (S. Korea, Singapore, Taiwan) and widespread early use of masks, physical distancing and the closure of schools and establishments (Hong Kong). In a comparison of 150 countries world-wide across 24 indicators, the tiger economies were ranked in the world's top ten in terms of their performance in COVID- 19 control (Figure 1 and Figure 2). The health measures taken by the tiger economies are well documented (Quigley, et al, 2020).

Less well known are the many other important measures that governments have to implement with urgency given the uncertainties of a rapidly evolving crisis. Governments, for example, also have to worry about the procurement, production, stockpiling and allocation of masks, personal protective equipment, testing kits, ventilators, oxygen, medicines, among many other scarce medical supplies that every other country wants to secure. Singapore and Hong Kong, highly vulnerable to disruptions in supply chains for food and other essentials have to work hard to ensure that they are kept open. Singapore and S. Korea have to significantly expand the capacity of their health facilities as well as increase the number of medical professionals to meet a surge in demand. Singapore has to take extra measures to rehouse,

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test, isolate, treat and feed thousands of its foreign workers living in dormitories. It also has to enforce physical distancing and stay at home order for at least 80% of its working population for at least a month. On top of these health control measures, the governments also have to quickly roll out and implement targeted measures to help hundreds of thousands of workers, households and businesses affected by the crisis and figure out how to keep the economy running.

We focus on the role of public administration in COVID-19 control. We show how the agility of governments in these tiger economies played a central role in controlling its spread in the first three months of the crisis. We suggest that this agility is the result of their experience with epidemics, as well as their capacities to deploy digital, behavioral, organizational, legal, political and financial solutions. The scope of responses needed for public health and the economy, the sense of urgency to respond, the need for large scale coordination across agencies and the private sector and the uncertainty for how long the crisis will last has put to test the capacity and agility of public administration systems all over the world.

Figure 1: Comparison of COVID-19 CONTROL (April 10, 2020)



Source: Forbes Magazine, 2020

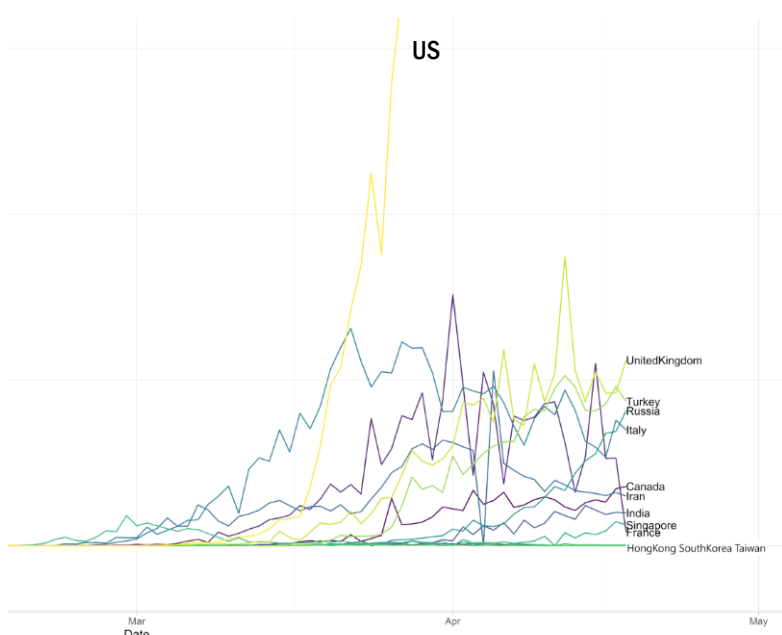


Figure 2: Daily cases of infections (scale 10,000)

Source: Financial Times Research April 15, 2020



We first describe how these East Asian Economies responded to the COVID-19 crises compared to the US and Europe. We then explain the dimensions of agility observed in these countries (regions). We conclude that the capacity and agility of governments would be a key determinant of the outcomes of COVID-19.

## **COMPARISON OF RESPONSES**

A distinguishing feature of the responses of the tiger economies is that they acted quickly and aggressively to control the first wave of the contagion. At the onset of the outbreak in China, four tiger economies quickly banned flights, first from the original epicenter in Wuhan and subsequently, all flights from China. Except for Singapore, citizens of Hong Kong, Taiwan and S. Korea started the widespread use of masks at the onset and do physical distancing. Most notably, Taiwan, S. Korea and Singapore performed massive contact tracing, testing, isolation and treatment. While Taiwan and S. Korea did not impose a national lockdown, Hong Kong early on shut down schools, government offices and non-essential establishments. Singapore was initially regarded as a gold standard for managing the outbreak with its targeted containment strategy but have to subsequently impose a circuit breaker in 7 April to deal with outbreaks from local and imported cases and foreign workers living in crowded dormitories. The circuit breaker policy comprised hard measures with enforcement and penalties including mandatory quarantine for all international travelers, ban on transit passengers, penalties for those who travel abroad they won't be covered with free treatment, mandatory wearing of face masks outside of homes, physical distancing, shutting down of non-essential businesses including schools, massive contact tracing, testing and isolation, among others.

## **TAIWAN**

As of this writing, Taiwan only had 393 cases and 6 fatalities, one of the lowest in the world as a proportion of the population. For over a month now, it registered zero infection and did not have to resort to a lockdown. Taiwan's story is interesting and well documented (Wang, et al. 2020). It took a contrarian view to the advice of the WHO in early January that there was no evidence of human to human transmission. Taiwan was skeptical, having learned its painful lessons from SARS in 2003 where 150,000 people were quarantined and 181 died. Its close proximity to China, where 2.7 million mainland tourists visited the island in 2019 and dense air and sea transport connectivity, heightened its risk awareness. Taiwan's contrarian view and heightened risk awareness made a significant difference in its ability to control the contagion. Based on this assessment, Taiwan quickly designated covid-19 as an infectious disease as early as January 15, ahead of most economies outside China.

This allowed the Taiwanese government to roll out 124 control measures (Wang et al, 2020). It gave the government powers to quarantine infected individuals, get its citizens to wear masks, wash hands, observe physical distancing and most importantly, compel companies to ramp up production of medical supplies. Taiwan banned flights from China as early as February 5 and followed up quickly on epicenters (S. Korea, Italy). Taiwan has managed to control the contagion from imported cases because of its early and stringent quarantine measures for arrivals which limited community contagion. The government ordered local companies to ramp up production of masks eventually producing 2M a day for a population of 23M. The government initially banned exports and systematically rationed the masks using digital identification to prevent panic buying and hoarding. Taiwan subsequently donated 10 million masks to other countries. Taiwan's deployment of digital technologies for contact tracing is also well-known. It deployed GPS tracking for at risk cases, SMS alerts, data analytics and use of national digital ID to ration masks and integration of travel, insurance and medical records. It helped that Taiwan has a universal health insurance coverage which motivated people to step forward and test.

## **SOUTH KOREA**

As of this writing S. Korea had 10,600 confirmed cases, 8,042 recovered and 234 fatalities (Worldometers, 2020). S. Korea was once an epicenter of COVID-19 (Daegu City) but has since effectively controlled its spread. S. Korea's internationally recognized performance can be attributed to its tracing, testing and treatment strategy. Massive contact tracing depended on its capable civil servants, aided by advanced digital infrastructure and innovative solutions. Once a case is confirmed, extensive tracing is done using all information from smartphone GPS, credit card, transportation, CCTV, etc. (Brookings, 2020). This anonymous information is publicly disclosed through a government website and social media portals. The focus of tracking was on the super spreader 'Case 31', a member of a megachurch.

S. Korea has tested 8,200 for every million people (US is 447 and UK is 2,100 per million). The government's ability to do mass testing depended crucially on two things. First, public-private cooperation made it possible to conduct mass diagnostic tests. Early in Jan. 27, public health authorities requested 20 local medical companies to develop test kits and supplies which made the country self-sufficient compared to New York and major cities in Europe. The private sector and regional governments deployed decentralized testing methods such as drive-through tests or telephone booth. Second, the well-established national health care system enabled people to quickly access diagnostic tests. Finally, the government took a differentiated treatment strategy by categorizing patients by risk and focusing limited medical resources on the high-risk patients (The Diplomat, 2020). For example, while low-risk patients such as the young or those with asymptomatic or mild symptoms are isolated into dormitories supported by private sector, the high-risk ones such as the elderly or those with severe or critical symptom are hospitalized in the negative pressure rooms. The S. Korea case clearly demonstrates a capable and agile government response to COVID-19.

## **HONG KONG**

Hong Kong's approach towards COVID-19 is piecemeal and gradual in nature. Given its mass protests in 2019, the Hong Kong government has been careful about its relationship with the central government of in Beijing which was reluctant to release the information of Wuhan outbreak to the outside world. The Hong Kong people were also skeptical of the government's administrative capacity in handling the virus spread.

Hong Kong's story highlights its experience with SARS in 2003 and other epidemics, the central role of public health experts and the well-established norms of wearing masks and physical distancing among the population. In fact, in a study published in Lancet (Cowling, et. al. 2020), the low incidence of infection in Hong Kong can be attributed to the early and widespread use of masks in the population, personal hygiene and early physical distancing (the closure of schools, government offices and limits to business establishments).

On 4 January, days after the first reported outbreak in Wuhan China, Hong Kong's health authority raised its alert to serious and three days later raised it to its highest level. This led to the closures of schools and government offices and bans on large-scale events. On contact tracing, Hong Kong had done an excellent job in 2003. Following the same protocol, in fighting COVID-19, Hong Kong has introduced some high-tech tools to effectively carry out contact tracing. For example, in SARS 2003, the data system of the health authority was integrated with the Major Incident Investigation and Disaster Support System (MIIDSS) at the Police Headquarter in Hong Kong (Hong Kong Department of Health, 2003). The system could match different versions of names, addresses and other details of confirmed cases, therefore, case clusters could be readily identified. This system could help investigators at the health authority to carry out prompt investigation afterwards. In late February 2020, the same system has been reactivated.

Furthermore, electronic wristbands accompanied by StayHomeSafe app were distributed to people arriving in Hong Kong to ensure that they are following the city's two-week quarantine and medical surveillance measures. The wristband drawing on geofencing technology can help the

government detect non-compliant behavior. The quarantine measures for arrivals from mainland China significantly helped slow down the spread of COVID-19.

## **SINGAPORE**

Singapore's capacity to deal with COVID -19 was forged out of its experience with SARS in 2003 and subsequently with other epidemics. Singapore acted fast and early. On 4 January, the Ministry of Health of Singapore had noticed one suspect case with travel history to Wuhan. It elevated its response to code orange on February 7th, the second highest on its alert system. As a small city state – Singapore took a whole of government approach similar to Taiwan and S. Korea. Practically its entire public administration system was mobilized - from the health ministry as lead agency, immigration (enforcement of quarantine rules), environment (enforcement of physical distancing, public sanitation), labor (roll out support to workers), foreign affairs (to repatriate citizens abroad, secure supply chains), education (home schooling), finance (financial package equivalent to 11% of GDP), central bank (support for affected borrowers), defense (rehousing and testing for foreign workers), law (bankruptcies and domestic abuse), housing (disinfection of public housing estates; rehousing foreign workers), communication (supply of free educational and entertainment content on TV and the web) and trade (for supply chain, food security and control of panic buying). Like Taiwan and S. Korea, having experienced SARS, Singapore stockpiled medical supplies and ramped up production of testing kits (and even donated to neighboring countries). Like Taiwan and South Korea, the same leadership of the SARS campaign in Singapore was mobilized again to lead the covid-19 campaign, ensuring that institutional memory and lessons learned were not lost and significantly cutting the time for on the job training.

Like Taiwan and South Korea, Singapore repurposed its established digital capacities to develop supplementary solutions (trace together app) for its human driven contact tracing, coordinate mask collection (gowhere), drones for crowd control, citizen reporting of violations of circuit breaker, temperature / health declaration online and a digital national ID system that facilitated the immediate roll out of financial support to workers, households and businesses. To preserve privacy from intrusive tracing and monitoring, government explained how the requirements of its Personal Data Protection Act is observed.

Digital innovations were complemented with the deployment of behavioral insights. For example, the decision to deploy calibrated and targeted containment measures early on (as against the hard lockdowns that many panicked cities and states imposed) was partly due to the risk of behavioral fatigue of the population resulting from a prolonged crisis (Low, 2020). A hard lockdown would badly hurt the economy, would be fiscally costly and therefore unsustainable. To encourage citizens and foreign workers to come forward for testing and treatment, the government promised free testing and healthcare. It helped considerably that Singapore has significant financial reserves to respond to the contagion and its economic aftermath, a result of years of saving for the rainy days.

In sum, Singapore's public administration approach to covid-19 control comprised a whole of government approach, policy implementation driven by key performance metrics (2 hour human driven contact tracing) and aided by digital solutions, use of behavioral insights in policy design, implementation and communication, risk-based, evidence informed cost – benefit analyses (targeted measures, population health vs. economy tradeoffs), extensive community engagement and credible enforcement with stiff penalties, Singapore style. All of these measures came second nature to the Singapore bureaucracy. As of this writing, Singapore is tackling the spread of the virus in cramped dormitories of foreign workers but overall, compared to other countries and cities, it has done relatively well for a globally connected, densely populated city.

## **THE US AND EUROPE**

In contrast, the US and most Western European countries (Spain, France, UK, France, Sweden) were caught unprepared and acted too little, too late. In the US, the first case of the virus was reported on January 20 in Washington State. Trump was in a state of denial for over two months - before declaring a national emergency on March 13. Trump initially rejected the use of face masks,

quarreled with State governors over procurement of masks and lifting of state lockdowns, shifted blame to China and WHO, gave false hopes for an untested drug and encouraged his armed supporters to oppose lockdowns. It was only on April 12 that Trump declared a major national disaster in all 50 states after it was apparent that it has gotten out of hand. A fact-check by CNN, however, showed that none of Trump's promises to control the virus (mass testing, availability of medical supplies) were realized on time as promised (CNN, 2020).

In the European Union, member states lost precious time quarrelling with each other over stockpiling and shipment of supplies, border closures and subsidies to less well-off members. Brussels had little authority on health issues. In the UK, experts criticized the government over its bungled response – toying with the idea of herd immunity, not requiring wearing masks, lax enforcement of physical distancing with bars remaining open and large public events being allowed (The Guardian, 2020).

## **AGILITY**

We have argued that a common distinguishing feature of these four countries (regions) is the agility of their public administration to respond quickly, aggressively and, so far, effectively to the health challenges of COVID-19. We identify several common factors associated with the agility of public administration in these four countries (regions).

The first factor is their common experience in repeatedly dealing with epidemics such as SARS, MERS, H1N1 and Ebola. This acute sense of vulnerability overtime is a key factor in the development of their capacity to deal with pandemics and to prepare for COVID-19. One evidence of this capacity is the zero-fatality rate among medical personnel in all four countries (regions) in contrast to most hard-hit countries which have to scramble for supplies for their medical staff. The first lesson therefore is nothing beats hands on experience in large scale crisis management.

Second, agility in crises management, and especially health pandemics, require capacity to decide quickly and reliably – in both strategic and operational terms. This requires the availability of reliable information to decision makers to enable them to decide on their next moves in a very fluid and uncertain context especially because of the very high transmissibility and asymptomatic nature of COVID-19. The capacity to collect, process, present and interpret data is vital in this situation. Likewise, the capacity to effectively contact trace thousands of individuals, test tens of thousands (more than 500,000 in South Korea as of this writing), effectively monitor and enforce quarantine orders for hundreds of thousands (at least 200,000 repatriates in Singapore) requires significant digital capacity. In South Korea, this involved use of privacy preserving facial recognition systems to alert the population of infected cases and GPS tracking for home quarantine. In Hong Kong, this involved wearing digital bracelets to enforce home quarantine measures. In Taiwan, this involved digital ID's to ration masks and along with Hong Kong, the integration of information on health, insurance and travel which made patient case management more efficient.

Third, the ability and agility to get things done depends on, among others, the organizational structure of public agencies (hierarchical, matrix), their coherence (bureaucracy vs. military) and crucially, their degree of autonomy (regular bureaucracies vs. relatively independent state-owned agencies and statutory boards). Fukuyama (2013) has argued that what distinguishes the quality of governments in general is the capacity and autonomy of their public administration. The governments of the tiger economies are well known for their professional capacity and innovation. Their public education, health care, airports, seaports and mass transport are of world class standards but this may not necessarily translate to effective and rapid response in crisis situations. The coherent structure and training of military is most suitable in crisis situations. The militaries of Singapore and Taiwan were deployed for contact tracing. In Singapore, they were also deployed to pack masks, perform massive testing of foreign workers in cramped dormitories, organize logistics for food, as well as to rehouse the tens of thousands of essential workers in ships, army camps, stadiums and hotels. This urgent and massive effort requires organizational coherence, logistics, training and discipline for which the military has been designed for.

Fourth, leadership matters in crisis situations but the ability of leaders to deliver depends on the size of the country, its political system (federal vs. unitary, presidential vs. parliamentary, central vs. local governments), the political capital of the government and the capacity of its civil service. Taiwan and S. Korea both have presidential – parliamentary systems which generally have more decisive powers in times of crisis situations. The central governments in S. Korea and Taiwan managed to secure the cooperation of their regional/local governments, in part because their leaders belong to the same political parties. Hong Kong and Singapore both have parliamentary systems and both have relatively small territories and populations and a single layer government. In the US, the federal government has to squabble with state governments over the procurement and stockpiling of medical supplies and powers over lock downs. In Europe, states quarreled over border closures, procurement and stockpiling of medical supplies and the financial package to mitigate the impacts of the virus. As usual, rich countries were reluctant to subsidize poorer ones.

The governments of Taiwan, S. Korea and Singapore, except Hong Kong, enjoyed high levels of political capital. In Singapore, for example, 67% of its citizens trusted the government (2019 Edelman Survey). In South Korea, doctors and scientists enjoy a high degree of trust compared to politicians. In Taiwan, the trust rating on the President's handling of the covid-19 was 68%. The ruling parties of S. Korea and Taiwan were returned to power with wide margins in their recent polls. High levels of trust give governments space to maneuver and deploy unpopular solutions such as circuit breakers in Singapore and intrusive digital solutions in Taiwan and S. Korea. In contrast in Hong Kong, health workers threatened to protest over government handling of cases from mainland China. Trust in government in crisis situations depends in large measure on its ability in crisis communication – that the government is on top of the situation, that it is telling the truth and that it can reassure an anxious population. In addition, trust in the competency of the civil service is crucial as well. The elite civil servants in these former tiger economies are generally trusted by their populations because they are perceived to be professional, highly educated, recruited on merit, not corrupt and well paid (Hong Kong and Singapore).

Fifth, agility in crises situations pretty much depend on the scope of powers delegated to public agencies, including especially powers on emergency procurement of essential medical supplies, ordering businesses to produce and or ramp up production of medical supplies and buy up excess production, ability to order lockdowns, flight bans among others. The tiger economies had no problems of shortages of testing kits, masks and personal protective supplies for their medical staff compared to the US and EU.

Finally, government capacity - financial, political capital, cognitive, logistical - in crisis situations can be easily overwhelmed. Civil society enhances the agility of societies in crisis situations. In Taiwan, the media and civil society quickly framed the emerging reports in Wuhan China as a crisis which prompted government to act quickly. In Singapore, NGOs and academics pointed to the challenges faced by foreign workers in cramped dormitories. Grassroots organizations were widely mobilized for mask distribution and helping vulnerable populations. In Hong Kong, the media and civil society pressured government over the scope of its financial support to workers and households and social welfare NGOs mobilized to help the vulnerable.

## **CONCLUSION**

In conclusion, there is no certainty on the final outcomes of COVID-19 as a rapidly evolving crisis. What is certain is that a capable and agile public administration would matter to the final outcomes of this catastrophe.

## WORKS CITED

- [Brookings, 2020. Combating COVID-19: Lessons from South Korea](#)
- [CNN, 2020. A timeline of Trump promises and predictions on coronavirus -- and how they stack up against the facts](#)
- [Cowling, et al. 2020. Impact of non-pharmaceutical interventions against COVID-19 and Influenza in Hong Kong: An observational study. The Lancet](#)
- [Forbes Magazine, 2020](#)
- [Fukuyama, Francis. 2013. What is Governance? Center for Global Development Working Paper No. 314.](#)
- [Hong Kong Department of Health. 2003. Contact Tracing in SARS.](#)
- [Low, D. 2020. How Singapore Can Draw Right Lessons from the corona virus crisis.](#)
- [Quigley, et al. 2020. Are high performing health systems resilient against the COVID-19 epidemic? The Lancet, Vol 395. Issue 10227, p. 848-850. March 14, 2020.](#)
- [The Guardian, 2020. UK Government's Coronavirus Response.](#)
- [The Diplomat, 2020. A Democratic Response to Coronavirus: Lessons from South Korea](#)
- [Wang, et. al. 2020. Response to COVID-19 in Taiwan. Big Data Analytics, New Technology, and Proactive Testing. Journal of American Medical Association. JAMA. 2020;323\(14\):1341-1342. doi:10.1001/jama.2020.3151](#)
- [Worldmodeters.info, 2020. Coronavirus Update \(live\)](#)

# WPME Course

Water Policy, Management, and Economics  
University of Oulu, Oulu, Finland

**2021** 4 & 5  
November

Attendance type:  
Physically and Online

## Lecturers:



**Dr. Kaveh Madani**

Associate Professor  
Council on Middle East Studies  
Yale University



**Dr. Ali Mirchi**

Assistant Professor  
Department of Biosystems and Agricultural Engineering  
Oklahoma State University, USA



**Dr. Stefanos Xenarios**

Associate Professor  
Graduate School of Public Policy  
Nazarbayev University, Kazakhstan



## Course elements:

**Integrated Water Resources Management**

**Water-Energy-Food Nexus**

**Water Governance and Institutional components**

**Water economics and management approaches**

**Water Bankruptcy**

**3 credits including: Compulsory attendance in the lectures and Submitting a learning diary**

**The number of attendees is limited, so please contact for registration sooner if you are interested in this course**

## **DR. MAXAT KASSEN PUBLISHED AN ARTICLE IN A PRESTIGIOUS INTERNATIONAL JOURNAL WITH HIGH IMPACT FACTOR**



*SHARED BY DR. MAXAT KASSEN*

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: *Technology in Society* (Q1 journal. Impact Factor 4.192). The article titled “Understanding decentralized civic engagement: Focus on peer-to-peer and blockchain-driven perspectives on e-participation” aims to understand the potential of blockchain phenomena to promote decentralized decision making and autonomous civic engagement in governance, i.e. engagement which is not initiated and managed by the public sector. This phenomenon has been often used as a popular slogan in various public speeches to highlight the importance of genuine civic interests in governance around the world, yet offering very limited options on how to promote such involvement. The advent of the digital era has facilitated the development of a plethora of digital participatory platforms that could presumably help to boost the effective engagement of civic communities in decision-making processes in an explicitly decentralized manner and, more so, the demand for such decentralized e-participation services is increasing during the current Covid-19 crisis. However, there is a real shortage of studies that directly focus on the analysis of such autonomous cases and all the more so from real life contexts in their natural settings. In this regard, this paper aims to fill the gap by analyzing the phenomena from an intrinsically peer-to-peer networking perspective, which could be observed today in popular autonomous civic engagement initiatives that have been launched in recent times in the area.

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

- [Kassen, M. \(2021\). Understanding decentralized civic engagement: Focus on peer-to-peer and blockchain-driven perspectives on e-participation. \*Technology in Society\*, 66, 101650.](#)





# Graduate School of Education

## CO-CREATING CULTURALLY RELEVANT SOCIAL SCIENCE RESEARCH ETHICS IN CENTRAL ASIA BY MEDIATING LOCAL AND GLOBAL INFLUENCES



*By Elaine Sharplin*

Regulation of human subject research ethics has evolved over the last 70 years in response to abuse of research participants, particularly in the bio-medical sciences. Now, international and national regulations are legislated in many countries, especially in the biomedical fields. Contemporary research ethics, are based predominantly on four principles of beneficence, autonomy, respect and justice, as developed by Beauchamp and Childress (2001) and encapsulated in the US Common Law and the Helsinki Declaration (WHO, 2001). However, criticisms have been made of the western ethnocentrism of the principles and conflict with cultural practices in diverse cultural contexts.

For this reason, the Graduate School of Education (GSE) is leading a research project, funded by a Nazarbayev University Collaborative Research Grant (№ 021220CRP0922) to develop an understanding of the contemporary context of social science research ethics in Central Asia. The project led by Professor Elaine Sharplin aims to develop research ethics protocols which may increase capacity for nationally, regionally and globally impactful knowledge production in the social sciences.

The reform agendas in the three countries of Kazakhstan, Kyrgyzstan and Uzbekistan, the sites for this research, recognise the current under-development in research and knowledge production. This has led to the establishment of national research and knowledge production goals. Research cultures in post-Soviet and similar countries are commonly under-developed, favour positivist research paradigms, and lack protocols for human subject research (Jonbekova, 2018; Robinson-Pant & Singal, 2013; Shamatov, Schatz & Niyozov, 2010; Strosberg, Gefenas, Loue & Philpott, 2013). Moreover, most researchers in Central Asia “work on the global periphery” (Suyarkulova, 2018), struggling to participate equitably in global knowledge production.

The research team argues that a factor limiting the dissemination of impactful social science research is the fact that research practices do not align with dominant global norms, particularly in relation to research ethics. Thus, there is a critical need for cocreating research and policy cultures that are relevant to the needs and future of the region, but commensurate with global principles.

Data collection for the project will commence in October with the first stage of an online survey being disseminated to social science researchers in higher education institutions across Kazakhstan, Kyrgyzstan and Uzbekistan. The survey aims to develop an understanding of existing research ethics processes available in research institutions, and to gain insight into the attitudes and knowledge of social science researchers.

In 2022, the research team will be seeking volunteers to participate in interviews about experiences of ethical research in the social sciences, and in particular views about the most appropriate ways of conducting ethical social science research in Central Asia. The research aims to develop research ethics protocols, which may increase capacity for nationally, regionally and globally impactful knowledge production.

If you would like additional information about the research or if you are interested in completing a survey or interview, please contact [elaine.sharplin@nu.edu.kz](mailto:elaine.sharplin@nu.edu.kz) or [care.project@nu.edu.kz](mailto:care.project@nu.edu.kz)

*The full research team includes: Aigul Zhakupova (Co-Principal Investigator), Ainagul Ismaniglova, Gulmira Rakisheva, from Sh. Ualikhanov Kokshetau State University (KSU), Kokshetau, Kazakhstan; Myrza Karimov, University of Central Asia (UCA), Bishkek, Kyrgyzstan; Bakhrom Mirkasimov, Westminster International University of Tashkent, Tashkent, Uzbekistan; Abror Juraev, Bukhara State University, Uzbekistan; Zakir Jumakalov, Kazakh Women's Teacher Training University, Kazakhstan and Elaine Sharplin (Co-Principal Investigator), Neil Collins (Co-Principal Investigator), Lynne Parmenter (Principal Investigator), Aziz Burkhanov Adil Ashirbekov, Gulzhanat Gafu, Roza Sagitova Aipara Berekeyeva, Markhabat Ramazanova; Zarena Syrgak and Raigul Albildina from Nazarbayev University.*

## REFERENCES

- Beauchamp, T. L., & Childress, J. F. (2001). Principles of biomedical ethics. Oxford University Press, USA.
- World Health Organisation (2001). Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects. Bulletin of the World Health Organization, 79 (4), np.
- Jonbekova, D. (2018): Educational research in Central Asia: Methodological and ethical dilemmas in Kazakhstan, Kyrgyzstan and Tajikistan. Compare: A Journal of Comparative and International Education, 50(3), 352–370.
- Robinson-Pant, A., & Singal, N. (2013). Researching ethically across cultures: Issues of knowledge, power and voice. Compare Special Issue, 43(4), 417-421.
- Strosberg, M.A., Gefenas, E., Loue, S., & Philpott, S. (2013). Building research ethics capacity in post-communist countries: Experience of two fogarty training programs. Journal of Empirical Research in Human Research Ethics, 8(5), 28–39. <https://doi:10.1525/jer.2013.8.5.28>.
- Shamatov, D., Shatz, E., & Niyozov, S. (2010). Peer-review publications for improving scholarship in Central Asia. American University in Central Asia Academic Review, 1(11), 172–179.
- Suyarkulova, M. (2018). Renegade research: Hierarchies of knowledge production in Central Asia. Open Democracy. <https://www.opendemocracy.net/en/odr/renegade-research/>



# Graduate School of Business

## BUSINESS DIGEST SERIES

July- September 2021

The *Business Digest Series* summarizes short pieces of research from GSB faculty, highlighting the key take-aways and policy implications, relevant for the wider business community and policy makers. The latest two digests zoom in on the role of family social experiences on employees thriving at work and on the role of private corporations to mandate Covid-19 vaccination. A *summary* follows below, the full digest is downloadable from the GSB website ([LINK](#)).

**Business Digest 2021/05, by Mayowa Babalola,**

This digest explores the differential effects of both negative (viz., family incivility, i.e., a low-intensity deviant behaviors with ambiguous intent that violate the norms of mutual respect within the family) and positive (viz., family support, i.e., i.e., the availability and quality of helping relationships from family members) family social experiences on employee thriving at work. Drawing from work-home resource theory, we consider family incivility as a contextual demand that impairs the completion of work-related activities (termed family-work conflict, FWC). We argue that this reality, in turn, creates an emotionally stressful experience that inhibits thriving at work. We also examine an enrichment pathway whereby family support, as a contextual resource, promotes positive resource transfer in the work domain (termed family-work enrichment, FWE). This, in turn, creates an enriching experience that enhances thriving at work.



**Business Digest 2021/06 by Gabriele Lattanzio,**

This digest reflects on the economics of Covid-19 vaccination mandates in corporations. Since the recent surge in new Covid infections in the U.S., 37 publicly traded U.S. corporations have taken action, reintroducing masks, and, in a few instances, vaccination mandates. These initiatives have ignited a heated moral, legal, and scientific discussion concerning if and to what extent private corporations should engage in these practices. The identified lack of market support for corporate vaccination mandates imposes a recalibration of the current academic and political debate concerning if and how private corporations should engage in this practice. Indeed, even if a compelling moral case rooted in eventual evidence supporting the positive social welfare implications of corporate vaccination mandates can be identified, it is crucial to recognize that managerial incentives are still not sufficient to pressure firms to adopt this socially oriented policy.



## **BEST PAPER PRIZE 2020 OF THE JOURNAL OF MANAGEMENT STUDIES**

NUGSB Faculty Akpeki (Ona) Akemu has won the best paper prize of the Journal of Management Studies for 2020. The paper reference is: Cornelissen, J., **Akemu, O.**, Jonkman, J. G. F., & Werner, M. (2020). Building character: The formation of hybrid organizational identity in a social enterprise. *Journal of Management Studies*. <https://doi.org/10.1111/joms.12640>. *JMS* is an FT50, ABDC A\* journal. It is also a NUGSB A\* journal also.

Congratulations!

## **GSB MASTER OF FINANCE STUDENTS DECLARED 1ST RUNNER UP AT THE ASIAN FINTECH BUSINESS PLAN COMPETITION**

On August 26, a NUGSB team with MSF students **Fayez Najib, Ruslan Baitlessov, and Pedro Mantilla** under the supervision of **Dr. Tom Vinaimont** was declared 1st Runner Up at the Asian FinTech Business Plan Competition organized by IFTA (Institute of Financial Technologists of Asia, Hong Kong). The NUGSB student team wrote and presented a business plan for the launch of SatuPal, an app the team envisions to integrate automated valuation for buying and selling of small- and medium-sized businesses with valuations made by experts. The judges of the Asian FinTech Business Plan Competition stated that «the idea behind SatuPal has high potential and [they] look forward to hearing about the project being implemented.» IFTA invited all universities in Hong Kong and Singapore and selected universities in Japan, China, Korea, and Kazakhstan to send in teams of 3 to 5 graduate students to participate in the competition. Congratulations to the NUGSB student team for being selected by the judges as 1st Runner Up and best wishes going forward with the implementation of SatuPal!

## **PRESENTATIONS OF GSB FACULTY IN CONFERENCES AND SEMINARS**

**David De Remer** presented his work on «*How Economic Interests Explain the Pattern of Subsidy Restrictions*» on September 9 at the **European Trade Study Group** held in a hybrid format in **Ghent University** from September 9-11.

**Joep Konings** presented his work on «*The impact of government support for R&D on firm level R&D spending and productivity*» at the Flemish **Government Department of Economics, Science and Innovation** in Brussels on August 23.

## **ACCEPTED AND FORTHCOMING PUBLICATIONS IN TOP PEER-REVIEWED JOURNALS 2021**

In **2020** the Graduate School of Business experienced a top year in terms of research output, with 16 published articles in renowned top peer-reviewed journals, various book chapters, and policy reports. With still three months to go to the end of the year, GSB has already more publications in **2021** than in 2020. An updated list is provided below, with additional seven publications **highlighted in bold** since June 2021.

### **Ona Akemu**

1. Cornelissen, J., **Akemu, O.**, Jonkman, J. G. F., & Werner, M. (2020). Building character: The formation of a hybrid organizational identity in a social enterprise. *Journal of Management Studies*. <https://doi.org/10.1111/joms.12640>. (5-year 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)
3. Walumbwa, O., Christensen, A. L., **Babalola, M.T.**, Kasimu, P., Garba, O. A., & Guo, L (in press). A closer look at how and when family-supportive supervision influences work interference with family: The roles of family-role overload and task crafting. *International Journal of Human Resource Management*. (Scopus Q1, Impact Factor = 3.040)

### **Mayowa Babalola**

4. Ren, S., **Babalola, M.T.**, Ogbonnaya, C., Hochwarter, W., Akemu, O., & Mintah, P. (in press). Employee Thriving at work: The long reach of family incivility and family support. *Journal of Organizational Behavior*. (ABDC Ranking A\*; ABS Ranking 4; Impact Factor = 8.174). <https://onlinelibrary.wiley.com/doi/10.1002/job.2559>
5. Riisla, K. Wendt, H., **Babalola, M.T.**, & Euwema, M. (2021). Building cohesive teams: The role of leaders' bottom-line mentality and behavior. *Sustainability*, 13(14) 8047. (Scopus Q1; Impact Factor = 3.251). <https://www.mdpi.com/2071-1050/13/14/8047/html>

### **Doron Israeli**

6. Unexpected Distractions and Investor Attention to Corporate Announcements, *Review of Accounting Studies* (5 yr impact factor: 5.0)
7. Stock Price Management and Share Issuance: Evidence from Equity Warrants, *The Accounting Review* (5 yr impact factor: 5.8)
8. The Real Side of the High-Volume Return Premium, *Management Science* (5 yr impact factor: 5.5)

### **Marek Jochec**

9. «How Do Limit Orders Affect the Disposition Effect on Highly Liquid Markets - Experimental Finance Evidence» in the *Journal of Behavioral Finance* (Q1, A-journal in ABC list), together with Hana Dvorackova and Tomas Tichy (published 2 Sept. 2021). <https://doi.org/10.1080/15427560.2021.1973006>

### **Joep Konings**

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

### **Thierry Post**

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

### **Chandra Shekhar Pathki**

14. **Pathki, C. S.**, Kluemper, D. H., Meuser, J. D., & McLarty, B. D. (2021). The Org-B5: Development of a Short Work Frame-of-Reference Measure of the Big Five. *Journal of Management* (5 yr impact factor: 8.8). <https://doi.org/10.1177/01492063211002627>
15. Vadera, A. K., & **Pathki, C. S.** (2021). Competition and cheating: Investigating the role of moral awareness, moral identity, and moral elevation. *Journal of Organizational Behavior*, 1– 22. (5yr impact factor: 5.0) <https://doi.org/10.1002/job.2545>
16. Puranik, H., Vough, H. C., & **Pathki, C. S.** (2021). Oops, I did it (again)! The emotional experience, interpersonal responses, and relational consequences of social gaffes in the workplace. *Journal of Organizational Behavior*, 1– 21. (5yr impact factor: 5.0) <https://doi.org/10.1002/job.2546>

### **Narendra Singh**

17. Intertemporal Product Management with Strategic Consumers: The Value of Defective Product Returns, *Manufacturing & Service Operations Management* (5 yr impact factor: 4.09)
18. «Is Your Retailer a Friend or Foe: When Should the Manufacturer Allow Its Retailer to Refurbish?» *Production and Operations Management (POM)* (impact factor:4.965)

### **Bektermir Ysmailov**

19. Interest Rates, Cash and Short-Term Investments, *Journal of Banking and Finance* (5 yr impact factor 3.07).

# ONLINE TEACHING OF BUSINESS PRINCIPLES TO 500 UNDERGRADUATE STUDENTS – OUR EXPERIENCE

*Moldir Kaiynbayeva and Tim Wawn<sup>1</sup>*



## INTRODUCTION

While the Covid-19 pandemic has had a devastating impact on the lives of many people and brought drastic changes to the way we live, the adoption of new technologies and ways of doing things forced on us by the pandemic has also brought some positive benefits.



Kazakhstan is one country where technology improvements in the delivery of government, court, banking, retail, and education services have benefited citizens. For most Kazakhstani citizens, it is now far easier to obtain government documents, undertake online transactions and learn online than it was prior to the COVID-19 pandemic. It is now even possible to get married and divorced online!

In this article, we talk about changes in the education sphere, based on our personal experience of teaching online the BUS101 Core Course in Business to undergraduate students at Nazarbayev University Graduate School of Business.

## BACKGROUND ON BUS101 CORE COURSE IN BUSINESS

The BUS 101 Core Course in Business (“BUS 101”) ran for the first time in the Fall 2020 semester and is now a compulsory subject for all undergraduate students at Nazarbayev University (“NU”). It was Nazarbayev University Provost Ilesanmi Adesida who originally initiated the idea for BUS 101. Based on his experience at other leading international universities, Provost Adesida believed that all NU students should develop some basic business, accounting, finance, and entrepreneurship skills as part of their undergraduate education.

We believe there are 4 main reasons why it is important for all undergraduate students to have some understanding of business fundamentals:

- Business plays an important role in society and most students will be dealing with businesses in their careers, whether they work in a business, for the government, as a teacher or as a researcher. Understanding the language of business, which is a key component of the Accounting and Finance module of BUS 101 can therefore help equip students for their future careers.
- As Kazakhstan President Tokayev indicated in his Address to the Nation on 1 September 2020, Kazakhstan needs to create a diversified and technology-based economy, if it is to achieve its long-term national goals. Developing a new generation of business people and entrepreneurs is one of the 7 basic principles for Kazakhstan’s future economic course outlined by President Tokayev in his Address.
- Contrary to common perceptions, Entrepreneurship is something that can be taught and it is wrong to think that you cannot be an entrepreneur. Entrepreneurs can come from anywhere. Therefore, it makes sense to expose as many students as possible to the principles of business and entrepreneurship. This is particularly true for students from STEM and other disciplines. A combination of strong technical skills plus an understanding of entrepreneurship and business is an excellent foundation for any student.
- As the COVID-19 pandemic has so profoundly demonstrated, we live in an era of great volatility, uncertainty, complexity, and ambiguity. An understanding of entrepreneurial principles can help us to navigate the uncertainties that we face in our lives and in our careers because, at its essence, entrepreneurship is about making decisions under conditions of extreme uncertainty. Learning what it is like to be an entrepreneur can help us make better decisions in our lives.

<sup>1</sup>Moldir Kaiynbayeva and Tim Wawn are Instructors at Nazarbayev University Graduate School of Business

## BUS 101 COURSE DESCRIPTION

The BUS 101 course consists of two modules: Accounting and Finance (A&F) module and Entrepreneurship and Management (E&M) module. Each module runs for 7 weeks in a fifteen-week semester, with a one-week mid-semester break.

The Core Learning Objective of the A&F module is to impart knowledge of the fundamentals of financial accounting and corporate finance and their roles in business organizations. This part of the course aims to provide students with a solid grounding of financial statement analysis, principles of risk-return tradeoff as well as elements of corporate finance.

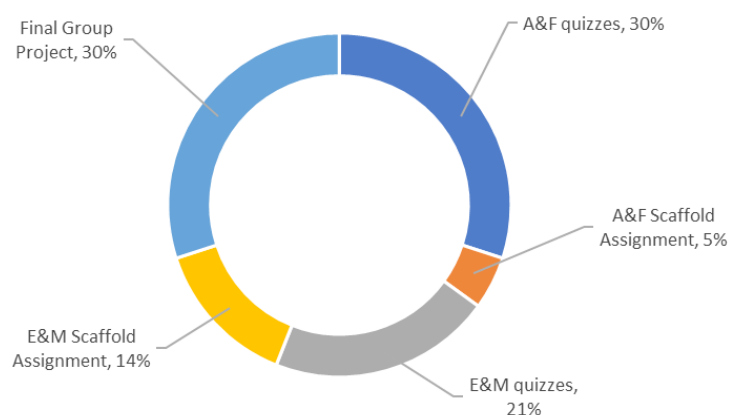
The Core learning Objective of the E&M module is to teach students about basic entrepreneurial and managerial concepts.

Due to the COVID-19 pandemic and a large student cohort of around 520 students, the BUS 101 course has been delivered in a wholly online mode since its inception. This has involved students viewing pre-recorded video lectures in their own time and then attending a 50-minute tutorial or recitation in groups of approximately 40 students. Students have also been required to undertake weekly quizzes, submit team-based assignments, and a Final Group Project where they present an entrepreneurial business idea with supporting financial projections.

Two Instructors are responsible for all aspects of the A&F module of BUS 101 and another two Instructors are responsible for all aspects of the E&M module.

Table 1 below describes the assessment structure for the BUS 101 course. Due to the large student cohort and online delivery, individual assessment tasks represent 51% of a student's final grade, and group assessment tasks represent 49% of a student's final grade.

Table 1  
Assessment structure



## BUS 101 Teaching Methods and Innovations

The combination of the COVID-19 pandemic, a very large student cohort, and a small group of Instructors, has necessitated a very sharp focus on sustainable and innovative approaches to learning and teaching. While Instructors are consistently seeking to improve course delivery, based on course feedback and student performance, the BUS 101 course appears to consistently implement the NU Quality Enhancement Theme of *"Sustaining Innovation in Learning and Teaching"*.

Some of the methods that have been adopted to deliver BUS 101 in an online learning environment include:

- The use of prerecorded videos, mostly using ActivPresenter platform, allows students to view learning material at their own time and pace. ActivPresenter has proven to be a good tool for recording educational videos and is free to use.
- Weekly recitation sessions where Instructors meet with groups of approximately 40 students using the Zoom platform to review learning materials and discuss issues. In the E&M module, Zoom breakout rooms were used to enable students to work in their teams on group assessment

tasks. Because students are often located in different geographical locations, offering students to work together in a Zoom breakout room during recitations has appeared to work well.

- Exercises, problems, articles for discussions are assigned to students on weekends before the recitations to give them an opportunity to apply the lecture knowledge before the recitations. Then this material is discussed with Instructors during recitations. Students can give their answers and receive feedback from the Instructors during recitations. This practice has proven to be particularly effective in increasing student engagement in the A&F module of the course.
- In the A&F module, students learn to use Excel to perform financial calculations and submit a simple financial model of their business opportunity which they have built in Excel. Students also learn to use finance websites such as Yahoo Finance to access financial statements, stock price charts, ratios, and other financial information of public companies.
- Individual online quizzes are held throughout the BUS 101 course using the Moodle platform to reinforce learning objectives and to provide individual feedback on learning progress.
- A key learning principle of BUS 101 is “learning by doing”. Thus, the primary assessment task for the BUS 101 course is a Final Group Project which requires students to work in teams to develop their own entrepreneurial opportunity, including describing their value proposition, business model and supporting financial projections. As part of the Final Group Project, teams need to prepare a written submission and a short 3–5-minute video where they pitch their idea to a panel of potential investors (represented by Course Instructors). As judged by Instructors, the best Final Group Project submitted by a team receives automatic entry into the Astana Business Campus (ABC) Incubator Program run by NURIS. This provides students with the opportunity to continue to develop their entrepreneurial opportunity once BUS 101 has ended. In some cases, other teams may also be accepted to the ABC Incubator Program if their business idea is deemed to be promising. This connection with NURIS not only represents an excellent opportunity for students to continue to develop their business idea but also helps forge closer connections between different areas of Nazarbayev University and assists in building a true entrepreneurial ecosystem within NU.

Table 2  
Example of Business Model Canvas produced by one student team for their Final Group Project<sup>2</sup>

<p><b>Key Partners</b></p> <ul style="list-style-type: none"> <li>• Cloud services for computation and database</li> <li>• Restaurants and cafes</li> <li>• Advertisement providers</li> </ul>	<p><b>Key Activities</b></p> <ul style="list-style-type: none"> <li>• App and website administration</li> <li>• Customer profile analysis</li> <li>• Implementing new features</li> </ul>	<p><b>Value Proposition</b></p> <ul style="list-style-type: none"> <li>• Noise level assessment</li> <li>• Occupancy monitoring</li> <li>• Lighting conditions (natural lighting, dim/bright lights)</li> <li>• Comprehensive labelling of places based on certain criteria (e.g. eco-friendly)</li> <li>• Personalized notifications (discounts, new location, change in working hours)</li> </ul>	<p><b>Customer Relationships</b></p> <ul style="list-style-type: none"> <li>• Automated service (the product adapts to the customer’s needs over time)</li> <li>• Co-creation (customers leave reviews which further facilitate the product utilization and increases value)</li> </ul>	<p><b>Customer Segments</b></p> <ul style="list-style-type: none"> <li>• Solvent citizens of Nur-Sultan, Almaty, Shymkent</li> <li>• Those who have a special diet or preferences in food</li> <li>• Those who are concerned with food waste</li> <li>• Those who go to cafes at least once a month</li> <li>• Those who do not have time to cook</li> <li>• Indecisive people</li> <li>• Those who do not like crowded and noisy places</li> <li>• Foreign tourists</li> </ul>
<p><b>Cost Structure</b></p> <ul style="list-style-type: none"> <li>• Maintenance of the app and website</li> <li>• Marketing and sales</li> <li>• Cost of salaries</li> </ul>	<p><b>Revenue Streams</b></p> <ul style="list-style-type: none"> <li>• Subscription fees for premium functionalities</li> <li>• Advertising</li> </ul>			

**Section Key**

■ Efficiency (back end) ■ Value (front end)

<sup>2</sup>This Final Group Project described an innovative idea for a food recommendation service



- Student teams are required to submit “Scaffolding Assignments” during the course which help build their Final Group Project submission. This reinforces learning objectives during the course and reduces stress for students in preparing and submitting their Final Group Projects.
- Because of the online learning environment and because groups assessment tasks represent a significant proportion of a student’s final grade, attempts have been made to mitigate “free-riding” by students in group work by requiring each team to confirm whether (in the team’s opinion) everyone in the team has made a legitimate contribution to the task submission and everyone should receive the same grade. This applies to both Scaffolding Assignments and Final Group Project submissions.

Table 3

Example of Income Statement and Calculated Investment Returns produced by one student team for their Final Group Project<sup>3</sup>

Years	0	1	2	3	4	5
<b>Revenues</b>		960,381	6,542,138	14,990,142	25,901,445	40,699,727
<b>Cost of Sales</b>	(10,750)	(9,125,990)	(9,125,990)	(9,125,990)	(9,125,990)	(9,125,990)
<b>Gross Profit</b>		₹ 8,165,609	₹ 2,583,852	₹ 5,864,152	₹ 16,775,455	₹ 31,573,737
<b>Expenses:</b>						
<b>S&amp;A expenses</b>		(610,750)	(16,733,991)	(17,141,992)	(17,549,993)	(17,957,994)
<b>Marketing expenses</b>		(1,632,000)	(1,032,000)	0	0	0
<b>Research&amp;Development</b>	(6,900,000)					
<b>Depreciation</b>		(150,000)	(150,000)	(150,000)	(150,000)	(150,000)
<b>EBIT</b>		₹ 10,558,359	₹ 20,499,843	₹ 11,427,840	₹ 924,538	₹ 13,465,743
<b>Income tax 10% (in 4-5 years)</b>		1,055,836	2,049,984	1,142,784	92,454	(1,346,574)
<b>Unlevered Net Income</b>		₹ 9,502,523	₹ 18,449,858	₹ 10,285,056	₹ 832,084	₹ 12,119,168
<b>Plus Depreciation</b>		150,000	150,000	150,000	150,000	150,000
<b>Less: capex</b>	(6,900,000)					
<b>Less: Increase in NWC</b>		816,561	(558,176)	(844,800)	(1,091,130)	(1,479,828)
<b>Free Cash Flows</b>	(6,900,000)	₹ 8,535,962	₹ 18,858,034	₹ 10,979,856	₹ 1,773,215	₹ 10,789,340
<b>Terminal Value</b>						₹ 118,682,743
<b>FCF with TV</b>	₹ 6,900,000	₹ 8,535,962	₹ 18,858,034	₹ 10,979,856	₹ 1,773,215	₹ 129,472,083
<b>DCF</b>	(6,900,000)	₹ 7,113,302	₹ 13,095,857	₹ 6,354,084	₹ 855,138	₹ 52,031,926
<b>NPV</b>		₹ 17,713,546				
<b>IRR</b>		35%				
<b>Payback Period</b>		<4.5 years				

## CHALLENGES AND DIFFICULTIES

As can be expected with a large student cohort operating in a wholly online environment, some challenges and difficulties have been encountered along the way in delivering the BUS course!

In Fall Semester 2020, initial attempts to hold an online quiz for over 500 students simultaneously, were not successful, with the Moodle system crashing under the load. However, Nazarbayev University CIO Chris Handley quickly responded to this situation by increasing Moodle capacity and Moodle quizzes have run smoothly since these initial difficulties.

As BUS 101 quizzes are conducted online, some students have complained that other students have been colluding in quizzes. This is a particular issue in an online environment. In order to mitigate cheating, we have introduced a system where all students undertake their quiz at the same time, answering random quiz questions drawn from a question bank (so that students do not answer the same questions) and sequential navigation rules in place (where students are not allowed to revisit questions already answered).

Some students have encountered difficulties in attending online assessment tasks such as online quizzes due to technical difficulties such as poor internet connection or other technical difficulties. In such cases, we always offer an alternative assessment task to affected students, such as a reflective journal submission which students are able to prepare offline and then submit. However, in order to avoid students taking unfair advantage of these alternative assessment tasks, students need to provide supporting evidence as to why they are unable to attend the online quiz assessment.

<sup>3</sup>This Final Group Project described an innovative idea related to medical insurance

While attempts have been made to counter 'free-riding' by students in group assessment tasks, it is likely that some students are still taking advantage of the work of others in the preparation of scaffolding assignments and Final Group Project submissions. While a surprising number of teams have identified colleagues who have not made a legitimate contribution to an assessment submission, there is still a reluctance by some students to identify free-riders.

While there are some concerns at the extent of material that students are expected to learn within a 15-week semester, students appear to be coping with the material.

## **CONCLUSION**

Overall, based on course evaluations and student feedback, delivering the BUS 101 course to over 500 students each semester in a wholly online environment has proven to be effective. Using available technology platforms such as Moodle and Zoom has enabled students to learn the fundamentals of financial accounting and corporate finance and helped them learn about basic entrepreneurial and managerial concepts. Through the preparation of scaffolding assignments and their Final Group Project submission, students learn to apply what they have learned by developing their own entrepreneurial opportunity.

While there have also been challenges in teaching business concepts to a large cohort of students online, the COVID-19 pandemic has led to the adoption of a number of initiatives which appear to have improved the learning experience for students.

Without the COVID-19 pandemic, these initiatives might never have been attempted and it is gratifying that some positive developments have occurred over the past 18 months, despite the difficult situation we have all faced.



# School of Mining and Geosciences

## SMG REMARKABLE STUDENTS ACHIEVEMENT



PREPARED BY NASSER MADANI AND RANDY HAZLETT

We are happy to announce that two of our recent Mining Engineering graduates received full scholarships for PhD studies in top Mining Schools in the world. The first, Sultan Abulkhair, master graduate of the class of 2021 received a full scholarship at the University of Adelaide,



Australia. The funding will be provided by ARC Training Centre for the Integrated Operations for Complex Resources in the University of Adelaide. The second NU student, Nursultan Iliyaz, master graduate of the class of 2020 received a full scholarship at the University of British Columbia, Canada. Along with three students from our very first cohort, this brings our total to five students who have gone on to study for their doctorate at top mining schools in the world. Please see the table below:

Full name	Graduate class	University	Country	Rank in the subject of Mining Engineering	Qualifications
Sultan Abulkhair	2021	University of Adelaide	Australia	7th in Shanghai ranking	Geostatistics, Mine Planning
Nursultan Iliyaz	2020	University of British Columbia	Canada	9th in QS ranking	Geostatistics, Mineral Resource Estimation
Yerkezhan Madenova	2019	Hokkaido University	Japan	Not Available	Geometallurgy, Rock Mechanics
Yerniyaz Abildin	2019	University of Adelaide	Australia	7th in Shanghai ranking	Geostatistics, Geometallurgy
Nurassyl Battalgazy	2019	University of Queensland	Australia	3rd in QS ranking	Geostatistics, Machine Learning

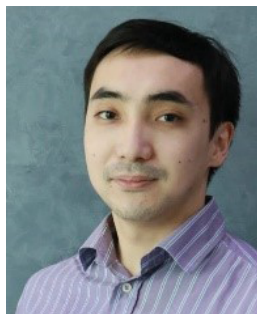
It is worth mentioning that these 5 students worked hard during their MSc studies and published in peer-reviewed journals under the supervision of Mining Engineering faculty members while assisting in their research projects. Below is the list of their peer-reviewed publications:

1. **Abulkhair, S.**, Madani, N. (2021). Assessing Heterotopic Searching Strategy in Hierarchical Cosimulation for Modeling the Variables with Inequality Constraints. *Comptes Rendus Géoscience*. Vol, 353 (1), P. 115-134.
2. Madani, N., **Abulkhair, S.** (2020). A hierarchical cosimulation algorithm integrated with an acceptance–rejection method for the geostatistical modeling of variables with inequality constraints. *Stochastic Environmental Research and Risk Assessment*. Vol, 34, P. 1559-1589. <https://doi.org/10.1007/s00477-020-01838-5>.
3. **Iliyas, N.**, Madani, N. (2021). An Enhanced Co-simulation Technique for Resource Modeling Using Grade Domaining: a Case Study from an Iron Ore Deposit. *Applied Earth Sciences*. 10.1080/25726838.2021.1882644.
4. **Madenova, Y.**, Madani, N. (2021). Application of Gaussian Mixture Model and Geostatistical Co-simulation for Resource Modeling of Geometallurgical Variables. *Natural Resources Research*. <https://doi.org/10.1007/s11053-020-09802-4>
5. **Madenova, Y.**, Suorineni, F. T. (2020). On the question of original versus modified stability graph factors—a critical evaluation. *Mining Technology*, 129(1), 40-52.
6. **Abildin, Y.**, Madani, N., Topal, E. (2019). A Hybrid Approach for Joint Simulation of Geometallurgical Variables with Inequality Constraint. *Minerals* 9(1), 24.
7. **Battalgazy, N.**, Madani, N. (2019). Stochastic Modeling of Chemical Compounds in a Limestone Deposit by Unlocking the Complexity in Bivariate Relationships. *Minerals*, 9, 683.
8. **Battalgazy, N.**, Madani, N. (2019). Categorization of Mineral Resources Based on Different Geostatistical Simulation Algorithms: A Case Study from an Iron Ore Deposit. *Natural Resources Research*, Vol 28(4), P. 1329-1351, <https://doi.org/10.1007/s11053-019-09474-9>

The SMG family wishes success to our alumni in all of their future endeavours.



Sultan Abulkhair



Nursultan Iliyas



Nurassyl Battalgazy



Yerkezhan Madenova



Yerniyaz Abildin



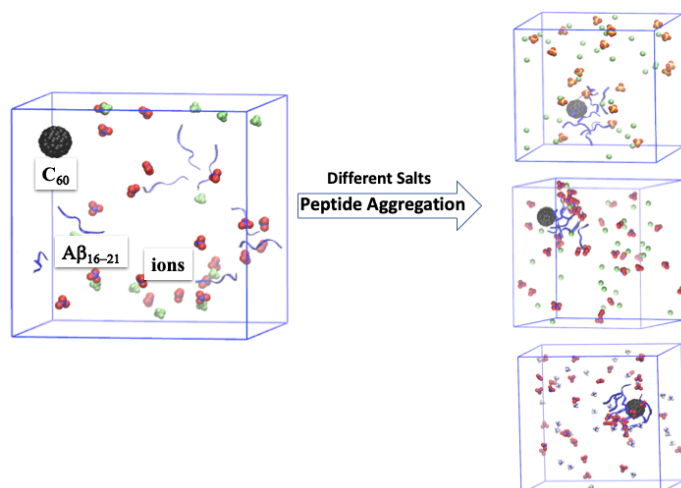
# School of Engineering & Digital Sciences

## CAN THE COMMON AIR POLLUTION LEAD TO EARLY ALZHEIMER'S DISEASE? EXPLORING THE CONNECTION USING MOLECULAR MODELING

BY SAMAL KAUMBKOVA, DR. MEHDI AMOUEI TORKMAHALLEH, DR. DHAWAL SHAH

The research team of SEDS studies the effect of air pollutants on the progression and early onset of Alzheimer's Disease by doing molecular dynamics simulations. The article has been published in prestigious journal of *Environmental Pollution*, available at the following [link](#).

Alzheimer's disease (AD) is a neurodegenerative disorder, associated with the aggregation of amyloid beta ( $A\beta$ ) peptides and formation of plaques (1). One of the environmental health and safety concerns is the toxicological impact of environmental pollutants, especially the fine particulate matter, on human health, particularly on the development of neurodegenerative diseases (2). Due to the small particle size, ultrafine particles (UFPs) can be absorbed into human blood, translocate to the human brain and contribute to the progression of neurodegenerative diseases (3). While in-vivo experiments reveal enhanced concentration of amyloid beta peptides in the brains of animals after the exposure to UFPs (4), the molecular interactions between peptides and atmospheric pollutants remain obscure. Multiple factors, including the composition, concentration and morphology of UFPs, and concentrations of other pollutants (absorbed in the blood) can affect the amyloidogenesis. In our work, systematic molecular dynamics simulations were performed to investigate the impact of carbon-based UFP, mimicked by fullerene  $C_{60}$  molecule, on the aggregation of amyloid  $\beta$  ( $A\beta$ ) peptides and formation of  $\beta$ -sheets, associated with the early onset of Alzheimer's Disease. Moreover, the synergistic effect of the UFP and environmental pollutants were analyzed at various concentrations of the ions found in the environmental realm, such as ammonium, nitrate and sulfate ions (Figure 1). The results revealed high propensity for the aggregation of  $A\beta_{16-21}$  peptides, the segment of  $A\beta_{42}$  peptide with high self-aggregation propensity and high contributions towards formation of amyloid plaques. Moreover, the peptides made clusters with the mimicked UFP molecules, that would be expected to act as a nucleation site for the formation of amyloid plaques and progression of Alzheimer's.



and progression of Alzheimer's. Taken together, the results showed that UFPs affects the peptide aggregation differently, depending on the type of ions present in the simulation environment. In the presence of  $C_{60}$ , sulfate and nitrate ions accelerated the aggregation of  $A\beta_{16-21}$  peptides, however, ammonium ions decelerated their aggregation. Overall, our results showed the formation of enhanced amounts of  $\beta$ -sheets in the systems with a slow initial rate of the aggregation of  $A\beta_{16-21}$  peptide octamer.

Figure 1. Representative snapshots of the simulated systems (water molecules are not shown)

Furthermore, polycyclic aromatic hydrocarbons (PAHs) are environmental pollutants, produced from human activities, such as cooking and smoking, and associated with increased risk for Alzheimer's Disease. Currently, in our research group we investigate the impact of PAHs, such as benzo[a]pyrene and phenanthrene, on the structure and aggregation of A $\beta$ <sub>42</sub> peptides (Figure 2). According to the preliminary results of the performed molecular dynamics simulations, strong interactions between A $\beta$ <sub>42</sub> peptides and benzo[a]pyrene molecules increased the aggregation kinetics of the peptides, consistent with in-vivo and in-vitro studies available in the literature (5,6).

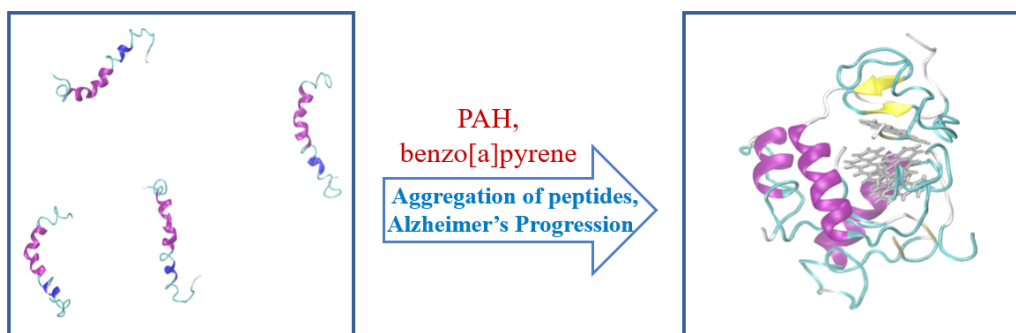


Figure 2. Representative snapshot of the simulated system with aggregation of A $\beta$ <sub>42</sub> peptides in the presence of benzo[a]pyrene molecules (water molecules are not shown)

## REFERENCES

1. Sun X, Chen W, Wang Y. beta-Amyloid: the key peptide in the pathogenesis of Alzheimer's disease. *Frontiers in Pharmacology*. 2015;6:221.
2. Lee M, Schwartz J, Wang Y, Dominici F, Zanobetti A. Long-term effect of fine particulate matter on hospitalization with dementia. *Environ Pollut*. 2019;254(Pt A):112926.
3. Ali, M. U. Pollution characteristics, mechanism of toxicity and health effects of the ultrafine particles in the indoor environment: Current status and future perspectives. *Crit. Rev. Environ. Sci. Technol*. 2020.
4. Zarandi S, Shahsavani A, Khodagholi F, Fakhri Y. Co-exposure to ambient PM<sub>2.5</sub> plus gaseous pollutants increases amyloid beta 1-42 accumulation in the hippocampus of male and female rats. *Toxin Reviews*. 2019:1-10.
5. D. Liu et al. Benzo(a)pyrene exposure induced neuronal loss, plaque deposition, and cognitive decline in APP/PS1 mice. *J Neuroinflammation*. 2020;17(1):258.
6. C. Wallin et al. Alzheimer's disease and cigarette smoke components: effects of nicotine, PAHs, and Cd(II), Cr(III), Pb(II), Pb(IV) ions on amyloid- $\beta$  peptide aggregation. *Sci Rep*. 2020;7(1): 14423

## SHORT BIO



**MSc Samal Kaumbekova** is a PhD student at School of Engineering and Digital Sciences, Nazarbayev University. She has a bachelor degree from Nazarbayev University in Chemistry and MSc from Nazarbayev University in Chemical Engineering. Her PhD research focuses on the molecular modeling of the impact of environmental pollutants on the amyloid beta peptides.



**Dr. Mehdi Torkmahalleh** is an assistant professor in chemical and materials engineering department at NU since 2015. His research interest is on atmospheric chemistry, exposure assessment and satellite observations. Dr. Torkmahalleh published over 8 high impact factor journal papers in the field of aerosol science in 2021 so far and several others are under preparation and review. He graduated in chemical engineering from University of Tehran with a B.Sc. degree. Then, he received a M.Sc. degree in biochemical engineering at Amirkabir University of Technology. He did his PhD at Clarkson University, USA. He recently led a global paper entitled “Global Air Quality and COVID-19 pandemic: Do we breathe cleaner air?” coauthored by more than 50 authors.



**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.



# School of Sciences and Humanities News

## ON THE RHETORICAL EXEMPLA AS ANALOGICAL ARGUMENT: THOTH IN PLATO'S PHAEDRUS



BY SHAWN RAMSEY

I have produced four articles in 2020-2021 regarding ancient rhetoric's origins and the relationship of non-Western myth systems. Some of my most recent work concerns the relationship of the Egyptian figure of Thoth to the dialogues of Plato.

The comprehensive knowledge that Plato possessed about Egyptian culture may never be fully known; but it is demonstrable that his choice of Thoth as exempla is not a (wholly) inauthentic representation of the Egyptian epistemological associations with Thoth but a logical choice that reflects firsthand knowledge based on the overall theme of *Phaedrus*. When one examines the primary texts concerning the nature of Thoth, it is apparent that Thoth stood as a convenient cognitive intermediary to ancient Egyptians, an idea that diametrically opposed Plato's his own epistemic theory. Plato's epistemic theory fundamentally underpinned his beliefs in the true rhetoric described in *Phaedrus*. It has been argued that to the ancient Egyptians, the end of Thoth's epistemic journey was to bring Ma'at between *sia* and *rekh*<sup>1</sup>. More axiomatically, the episode from *Phaedrus* has been interpreted as a critique of writing as deleterious to memory. A less axiomatic explanation is that to Plato, the truest rhetorical epistemic was to move the soul of the listener to truth, an action that was ideally and purely achieved between human actors which did not require the mediation of the gods. But by more closely examining the primary sources associated with Thoth, the nature of Egyptian rhetorical epistemology can be more thoroughly understood by way of Plato's



Fig. Thoout, Thoth Deux fois Grand, le Second Hermés, N372.2A, Brooklyn Museum

choice to counterbalance his own perspective, and can be instructive to illustrate a uniquely Egyptian rhetorical-epistemic perspective. In this argument I assert that if, as is possible, Plato knew Thoth's role in Egyptian epistemic theory it was offered in contrast to his own in *Phaedrus* by employing Thoth and his properties by analogy. I do so through by examination of Egyptian epistemic rhetorical theory through reference to primary sources in the Egyptian corpus. While Plato's Thoth is an obvious inauthentic representation of Egypt's Thoth to advance Plato's argument, the tension between Plato's epistemic perspective and that of its Egyptian counterpart illustrates that the exempla is not so much a critique of writing or its corrosive effect on memory, but a critique of a theory of a mediated epistemology as an inferior means to ascertaining truth.

<sup>1</sup>Vasunia, Phiroze. *The Gift of the Nile : Hellenizing Egypt from Aeschylus to Alexander*. Berkeley: University of California Press, 2001.





Fig. 2 Detail from the Papyrus of [Hunefer](#) (c. 1275 BCE) depicts the jackal-headed [Anubis](#) weighing a heart against the feather of truth on the scale of [Maat](#), while ibis-headed Thoth records the result. This is referred to as “The Judgment of the Dead”.

For those unfamiliar with Thoth in the context of systematic Egyptian beliefs, it could be advisable to discuss him in general terms most relevant to this argument. Thoth is generally depicted either as a baboon with a symbol of the moon above his head, or as a male human figure with the head and long, curved beak of the Egyptian Ibis. Thoth is famously pictured holding the writing instruments in funerary cartouches and frescoes depicting The Judgment of the Dead. During this process, he is often depicted holding the reed and the palette of a scribe; there is some scholarly disagreement about whether he merely recorded the result of the judgment or was, himself, judge<sup>2</sup>. Thoth, in the conventional interpretation of Egyptian cosmogony, is characterized as the “right hand” of Re, the solar creator-god, and he holds the record of the names of all the gods; some were regarded, like Thoth, as the courtiers of Re, and generally were referred to as the Ennead<sup>3</sup>. Thoth is notably the scribe of the Gods and patron of scribes, thus closely associated with writing with even a cursory examination of his visual depictions. Jennifer Westerfield points out that one way to determine this are the many epithets related to writing reserved for Thoth, “In the Egyptian sources, Thoth is reckoned as “excellent of speech(*ik r dd*),” “lord of script (*nb sh*),” “lord of books (*hk3 md3t*),” “excellent scribe(*sh ik r*),” and “he who gave words and script (*rdi mdw drf*),” among other titles”.<sup>4</sup> Thoth was also a messenger between the gods and central to communicative interaction among them.<sup>5</sup> Common epithets for Thoth in inscriptions are “lord of the divine words”<sup>6</sup>; he is the one who “has let the writings speak,” “invented the letters,”<sup>7</sup> and “began the writings”.<sup>8</sup> William A. Covino has noted that the juncture of rhetoric and literacy in Western history occur “in the person of the Ibis-headed Thoth” and that he is “the emissary of occult knowledge” to mankind.<sup>9</sup>

Yet Thoth appears as a seeming anomaly in *Phaedrus*. Plato tells the story of the Theuth as the mythic inventor of writing. Plato begins “I heard, then, that at Naucratis<sup>10</sup>, in Egypt, was one of the ancient gods of that country, the one whose sacred bird is called the ibis, and the name of the god himself was Theuth (*Θεύθ*).<sup>11</sup> Theuth presents the invention of writing to the god Thamus, to Egyptians known as Ammon (Ra or Re), Thamus-Ra himself calls Thoth “the father of letters” (*πατήρ ὧν γραμμάτων*).<sup>12</sup> Though seemingly, an anomalous appearance in a dialogue, Plato’s understanding of Egyptian philosophy was likely far more intimate than modern scholarship suggests. Plato’s actual visit or visits to Egypt remain a subject of speculation by modern historians and therefore a scholarly debate not central to this argument, but ancient writers discussed the Egyptian travels associated with his biography with telling consistency. That he traveled extensively during his life is attested to in his *Seventh Letter*. Cicero states that Plato went to Egypt after hearing of the death

<sup>2</sup>See generally Stadler, M. A. (2012). Thoth. *UCLA Encyclopedia of Egyptology*, 1(1).

<sup>3</sup>Meeks, Dmitri and Christine Favard-Meeks. *The Daily Life of the Egyptian Gods*. Cornell University Press, 1996. 43-44.

<sup>4</sup>Westerfield, *Egyptian*, 36.

<sup>5</sup>Stadler, Martin Andreas. *Weiser und Wesir: Studien zu Vorkommen, Rolle und Wesen des Gottes Thot im ägyptischen Totenbuch*. Vol. 509. Mohr Siebeck, 2009.124-34. This is the most authoritative recent study of Thoth primarily in the Pyramid Texts. It supersedes Boylan for references to Thoth which appear pervasively in Egyptian inscriptions and texts.

<sup>6</sup>Leitz, C., ed. *Lexikon der ägyptischen Götter und Götterbezeichnungen*. 6 vols. OLA 110–16, 129. Leuven 2002–3. 3.654.

<sup>7</sup>Leitz, *Lexikon*, 4.746

<sup>8</sup>Leitz, *Lexikon*, 7.18

<sup>9</sup>Covino, William A. *Magic, rhetoric, and literacy: An eccentric history of the composing imagination*. SUNY Press, 1994. at 19.

<sup>10</sup>Naucratis was known as Hellenion (Ἑλληνιον), an outpost founded in the 6th Century BCE.

<sup>11</sup>Plato, *Phaedrus*, 274c.

<sup>12</sup>Plato, *Phaedrus*, 275a.

of Socrates<sup>13</sup> and in *De Finibus* “to study in Egypt with *barbarian priests*”.<sup>14</sup> Quintilian, in *Instituio Oratoria*, stated that Plato “was not merely content” with the teachings of Athens or the Sicilian Pythagoreans “but even approached the *priests of Egypt* and made himself thoroughly acquainted with *all their secret lore*”.<sup>15</sup> The biographer Diogenes Laertius reports that Plato, after withdrawing from Athens and eventually travelling to Sicily, went “thence to Egypt to see those who interpreted the will of the gods”.<sup>16</sup> Diodorus Siculus similarly states that Plato sought knowledge of numbers and astronomy from the priests (*sacerdotibus*) of Egypt.<sup>17</sup> While remote in time from Plato’s own life, the later accounts seem entirely too unanimous and embroidered with consistent detail to be wholly ignored. Plato’s choice to portray Thoth, the scribe of the Gods and patron of scribes, as exempla in *Phaedrus* could be seen as a very intentional choice if contextual clues are examined from Egyptian culture. In the Egyptian textual corpus, there is no evidence of any narrative similar to the one concerning Thoth in *Phaedrus*.

Moreover, a close examination of Egypt’s rhetorical epistemic thought reveals a compelling reason for Plato’s invocation of Thoth in *Phaedrus* 275a-b, if we assume he possessed some degree of firsthand knowledge of the epistemic nature of Thoth himself. While Thoth personified the mediating power of rhetoric and more broadly conceived, the connection between sign and word, in a rhetorical sense he therefore mediated knowledge itself between persons. Thoth is the proverbial god of the crossroads of knowledge, occupying spaces between concepts, things, signs and actors. Plato viewed such a mediating figure as unnecessary, as his epistemology called for a more direct egress to pure knowledge; the Egyptians believed an epistemic intercession by Thoth was required to access knowledge. A closer examination explains not only Plato’s invocation of Thoth as an epistemological counterpoint to Socrates in the *Phaedrus*, but can provide a more nuanced understanding of both *Phaedrus* and Egyptian rhetoric. To put it another way, examining the relationship of Thoth as an epistemic figure not only offers a possible explanation of Plato’s compositional choice in *Phaedrus*, but illustrates how it was shaped by a living ecology of Egyptian ideas, and what those ideas as personified by Thoth actually were. Relevant texts concerning the nature of Thoth’s participation in signs, magic and writing. Their interrelationship hinges on Thoth’s interstitial role between epistemology and the rhetorical act.

The Theuth exempla in *Phaedrus* is frequently interpreted as an overt critique of writing as an unnecessarily mediated mode of conveying the truth. Plato’s critiques of writing appear both in *Phaedrus* and the *Seventh Letter*. Thoth not only appears in *Phaedrus*, but in *Philebus* which likewise refers to his role as the inventor of writing.<sup>18</sup> Ancient Greek culture regarded Thoth as an aspect or version of their own god Hermes;<sup>19</sup> but it is clear from Plato’s contextual cues in *Phaedrus* the he refers to a specifically Egyptian deity of great antiquity and does not mention Hermes at all in sections 273-276 of the dialogue. The puzzling choice of exempla to advance Socrates’ argument in the dialogue is even remarked on by Phaedrus, who observes “Socrates, you easily make up stories of Egypt or any country you please”.<sup>20</sup> In response, Socrates acknowledges that the myth may or not be from Egypt at all, replying “to you, perhaps, it makes a difference who the speaker is and where he comes from, for you do not consider only whether his words are true or not”.<sup>21</sup>

<sup>13</sup>Cicero. *De re publica; De legibus*. Trans. Clinton Walker Keyes. Cambridge, MA: Harvard UP, 1977, I.16.

<sup>14</sup>Cicero *De Finibus Bonorum et Malorum*. Trans. H. Rackham, M.A. London: William Heineman, 1914, 5.29;

<sup>15</sup>Quintilian, *Instituio Oratoria* I. Trans. H. E. Butler. Cambridge, MA: Harvard UP, 1958. 1.12.15.

<sup>16</sup>Diogenes Laertius. *Lives of Eminent Philosophers*. Trans. R.D. Hicks. Cambridge. Harvard University Press. 1925, 3.6.

<sup>17</sup>Diodorus Siculus. *Diodorus of Sicily in Twelve Volumes with an English Translation* by C. H. Oldfather. Vol. 4-8. Cambridge, Mass.: Harvard University Press; London: William Heinemann, Ltd. 1989, 8.96.

<sup>18</sup>Thoth appears again in *Philebus* in Plato. *Statesman. Philebus. Ion*. Translated by Harold North Fowler, W. R. M. Lamb. Loeb Classical Library 164. Cambridge, MA: Harvard University Press, 1925, 18b. “When someone, whether god or godlike man,—there is an Egyptian story that his name was Theuth—observed that sound was infinite, he was the first to notice that the vowel sounds in that infinity were not one, but many, and again that there were other elements which were not vowels but did have a sonant quality,” thereby inventing the alphabet.

<sup>19</sup>Bortolani, Ljuba Merlina. «The Greek Magical Hymn to Hermes: Syncretism or Disguise? The Hellenization of Thoth in Graeco-Egyptian Magical Literature.» In *Tracking Hermes, Pursuing Mercury*. Oxford University Press, 2019.

<sup>20</sup>Plato. *Phaedrus*, 275b. ὦ Σώκρατες, ῥαδίως σὺ Αἰγυπτίους καὶ ὀποδαπούς ἂν ἐθέλης λόγους ποιεῖς.

<sup>21</sup>Plato. *Phaedrus*, 275c. οὐ γὰρ ἐκείνο μόνον σκοπεῖς, εἴτε οὕτως εἴτε ἄλλως ἔχει;



Fig 3 Modern impression of an [Achaemenid](#) cylinder seal from [Iran](#), with king holding two lion griffins at bay and Egyptian [hieroglyphs](#) reading «Thoth is a protection over me». Circa 6th–5th century BC. Metropolitan Museum of Art.

Socrates states that, like the most ancient prophetic utterances, the myth is of great antiquity.<sup>22</sup> But in the context of an organic reading of the whole of the *Phaedrus*, it must be considered that the exempla of Theuth is offered in response to Phaedrus' question about the speech of Lysias, which happens to be in writing.

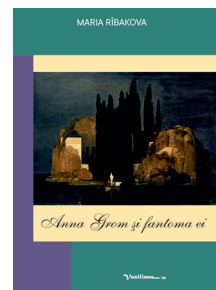
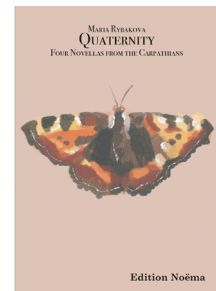
Would you like to know more? Of course you would, who wouldn't? The article is in final stages of peer review and likely forthcoming in 2022.



## SSH PROFESSOR PUBLISHED TWO BOOKS

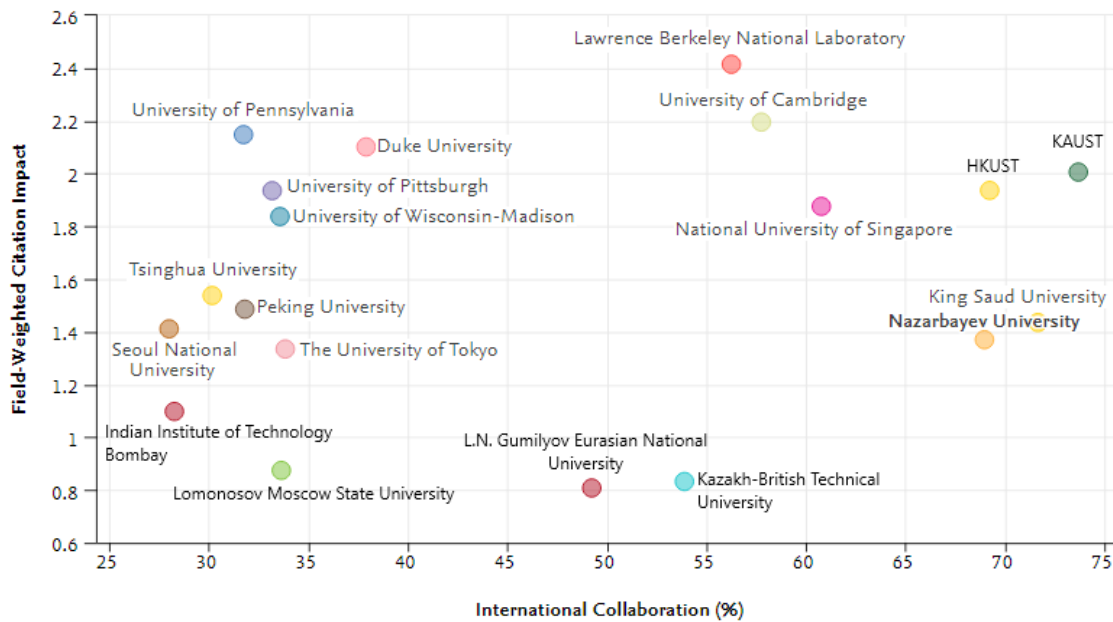
Maria Rybakova's «Quaternity: Four Novellas From The Carpathians» appeared in September 2021 with the Ibidem Press. Maria wrote this book while on Fulbright Fellowship to Romania in 2019-20. The novellas focus on anxieties, loves, and mistaken identities in the late 20th century.

A Romanian translation of Rybakova's other novel, «Anna Grom and Her Phantom,» was published in September 2021 as well, by Editura Vasiliana, in Marina Vraciu's translation. This novel is epistolary and tells about an otherworldly journey of a soul. It has previously been translated into German and Spanish.



<sup>22</sup>Plato. *Phaedrus*, 275b. τοῖς μὲν οὖν τότε, ἅτε οὐκ οὔσι σοφοῖς ὥσπερ ὑμεῖς οἱ νέοι, ἀπέχρη δρυὸς καὶ πέτρας ἀκούειν ὑπ' εὐηθείας, εἰ μόνον

# 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 5,303 peer-reviewed publications indexed by Scopus, and have been cited 39,155 times for 2011-2021 period (Source: Scopus, September 2021). The approximate number of citations per peer-reviewed publication is 7.38. The overall H-index of NU is 61, whereas H5-index is 45. The field-weighted citation impact is 1.37, meaning that our publications have been cited 37% 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](mailto:ssadykova@nu.edu.kz))

# FUNDING OPPORTUNITIES

#	<u>Opportunity</u>	<u>Funder</u>	<u>Deadline</u>	<u>Source link</u>
<a href="#"><u>1</u></a>	Jesse's Journey 2021/22 Research Grant Cycle	Jesse's Journey Foundation	15/10/2021	<a href="#"><u>URL</u></a>
<a href="#"><u>2</u></a>	eXtended Reality Modelling (RIA) - HORIZON-CL4-2021-HUMAN-01-13	Horizon Europe Framework Programme	21/10/2021	<a href="#"><u>URL</u></a>
<a href="#"><u>3</u></a>	Workforce skills for industry 5.0 (RIA) - HORIZON-CL4-2021-HUMAN-01-26	Horizon Europe Framework Programme	21/10/2021	<a href="#"><u>URL</u></a>
<a href="#"><u>4</u></a>	Emerging Technologies in Cell and Gene therapy - HORIZON-EIC-2021-PATHFINDERCHALLENGES-01-03	Horizon Europe Framework Programme	27/10/2021	<a href="#"><u>URL</u></a>
<a href="#"><u>5</u></a>	Tools to measure and stimulate activity in Brain Tissue - HORIZON-EIC-2021-PATHFINDERCHALLENGES-01-02	Horizon Europe Framework Programme	27/10/2021	<a href="#"><u>URL</u></a>
<a href="#"><u>6</u></a>	Neuromuscular Research Program 2021-2022 Grant Competition	Muscular Dystrophy Canada	29/10/2021	<a href="#"><u>URL</u></a>
<a href="#"><u>7</u></a>	Young Investigator Award	Melanoma Research Alliance	03/11/2021	<a href="#"><u>URL</u></a>
<a href="#"><u>8</u></a>	Global Issues – Preventing Pandemics: the Role of Human-Environmental Interactions	The Volkswagen Foundation	04/11/2021	<a href="#"><u>URL</u></a>
<a href="#"><u>9</u></a>	Research-Practice Partnerships: Collaborative research for educational change	The Spencer Foundation	10/11/2021	<a href="#"><u>URL</u></a>
<a href="#"><u>10</u></a>	Ensured infrastructure resilience in case of Pandemics - HORIZON-CL3-2021-INFRA-01-02	Horizon Europe Framework Programme	23/11/2021	<a href="#"><u>URL</u></a>
<a href="#"><u>11</u></a>	General Research Grants: Projects	the Gerda Henkel Foundation	24/11/2021	<a href="#"><u>URL</u></a>
<a href="#"><u>12</u></a>	Research Grants on Education: Small	The Spencer Foundation	01/12/2021	<a href="#"><u>URL</u></a>
<a href="#"><u>13</u></a>	PSF Translational and Innovation Research Grant	THE PLASTIC SURGERY FOUNDATION	01/12/2021	<a href="#"><u>URL</u></a>
<a href="#"><u>14</u></a>	PSF/MTF Biologics Allograft Tissue Research Grant	THE PLASTIC SURGERY FOUNDATION	01/12/2021	<a href="#"><u>URL</u></a>
<a href="#"><u>15</u></a>	2021 Pilot Award	Simons Foundation Autism Research Initiative (SFARI)	08/12/2021	<a href="#"><u>URL</u></a>
<a href="#"><u>16</u></a>	Damon Runyon Clinical Investigator Award	Damon Runyon Cancer Research Foundation	02/01/2022	<a href="#"><u>URL</u></a>
<a href="#"><u>17</u></a>	GLOBAL TEAM SCIENCE AWARD	The Lupus Research Alliance (LRA)	01/04/2022	<a href="#"><u>URL</u></a>
<a href="#"><u>18</u></a>	Personalised blueprint of chronic inflammation in health-to-disease transition - HORIZON-HLTH-2022-STAYHLTH-02-01	Horizon Europe Framework Programme	21/04/2022	<a href="#"><u>URL</u></a>
<a href="#"><u>19</u></a>	Open Application for Funding from NTAP	The Johns Hopkins University School of Medicine - Neurofibromatosis Therapeutic Acceleration Program (NTAP)	14/12/2022	<a href="#"><u>URL</u></a>
<a href="#"><u>20</u></a>	Innovative Research grant in Macular Degeneration Research	BRIGHTFOCUS FOUNDATION	Not specified	<a href="#"><u>URL</u></a>

## FUNDING OPPORTUNITIES

#	<u>Opportunity</u>	<u>Funder</u>	<u>Deadline</u>	<u>Source link</u>
<a href="#"><u>21</u></a>	Opportunity for international teachers: Fulbright Teaching Excellence and Achievement Program (Fulbright TEA) General Pedagogy Cohort	International Research and Exchanges Board	Not specified	<a href="#"><u>URL</u></a>
<a href="#"><u>22</u></a>	NIDA Hubert H. Humphrey Drug Abuse Research Fellowship	National Institute on Drug Abuse	Not specified	<a href="#"><u>URL</u></a>
<a href="#"><u>23</u></a>	The LAM Foundation`s grants	The LAM Foundation	Not specified	<a href="#"><u>URL</u></a>
<a href="#"><u>24</u></a>	Decoding Immune-Mediated Diseases – Novel Approaches for Therapeutic Insights grants	JDRF, Lupus Research Alliance and National Multiple Sclerosis Society	Not specified	<a href="#"><u>URL</u></a>
<a href="#"><u>25</u></a>	Targeted Grants in MPS	The Simons Foundation’s Mathematics and Physical Sciences (MPS) division	Not specified	<a href="#"><u>URL</u></a>

## New research publications indexed by Scopus (count: 260)

- Aakyiir, M., Oh, J. -, Araby, S., Zheng, Q., Naeem, M., Ma, J., . . . Mai, Y. -. (2021). Combining hydrophilic MXene nanosheets and hydrophobic carbon nanotubes for mechanically resilient and electrically conductive elastomer nanocomposites. *Composites Science and Technology*, 214 doi:10.1016/j.compscitech.2021.108997
- Abbas, A. H., Pourafshary, P., Wan Sulaiman, W. R., Jaafar, M. Z., & Nyakuma, B. B. (2021). Toward reducing surfactant adsorption on clay minerals by lignin for enhanced oil recovery application. *ACS Omega*, 6(29), 18651-18662. doi:10.1021/acsomega.1c01342
- Abdulkassimova, M., Kanabekova, P., Bauyrzhanova, Z., Ukybassova, T., Kaldygulova, L., Imankulova, B., . . . Almawi, W. Y. (2021). Association of human forkhead box protein 3 (FOXP3) gene polymorphisms with idiopathic recurrent pregnancy loss among kazakhstani women. *Gene*, 801 doi:10.1016/j.gene.2021.145835
- Abdulla, K. (2021). Corrosive effects of corruption on human capital and aggregate productivity\*. *Kykl os*, doi:10.1111/kykl.12279
- Abilkassov, S., Kairgaliyev, M., Zhakanov, B., & Abibullaev, B. (2021). A system for drivers' cognitive load estimation based on deep convolutional neural networks and facial feature analysis. Paper presented at the Proceedings of the IEEE International Conference on Industrial Technology, , 2021-March 994-1000. doi:10.1109/ICIT46573.2021.9453521 Retrieved from www.scopus.com
- Adoko, A. C., Moesi, D., & Sharipov, A. S. (2021). Empirical relationship for drilling rate in hard rock underground mines. Paper presented at the IOP Conference Series: Earth and Environmental Science, , 833(1) doi:10.1088/1755-1315/833/1/012135 Retrieved from www.scopus.com
- Adoko, A. C., Saadaari, F., Mireku-Gyimah, D., & Imashev, A. (2021). A feasibility study on the implementation of neural network classifiers for open stope design. *Geotechnical and Geological Engineering*, doi:10.1007/s10706-021-01915-8
- Adolfo, C. S., Almazan, J. U., Cruz, J. P., Albougami, A. S. B., Roque, M. Y., & Montayre, J. (2021). Saudi arabian nurses' workaholic tendencies and their predictive role in professional quality of life. *Perspectives in Psychiatric Care*, doi:10.1111/ppc.12913
- Afzal Tajik, M., Shamatov, D., & Fillipova, L. (2021). Stakeholders' perceptions of the quality of education in rural schools in kazakhstan. *Improving Schools*, doi:10.1177/13654802211031088
- Aimagambetova, G., Babi, A., Issanov, A., Akhanova, S., Udalova, N., Koktova, S., . . . Issa, T. (2021). The distribution and prevalence of high-risk hpv genotypes other than hpv-16 and hpv-18 among women attending gynecologists' offices in kazakhstan. *Biology*, 10(8) doi:10.3390/biology10080794
- Aimagambetova, G., Kaiyrlykyzy, A., Bapayeva, G., Ukybassova, T., Kenbayeva, K., Ibrayimov, B., . . . Terzic, M. (2021). Validation of pipelle endometrial biopsy in patients with abnormal uterine bleeding in kazakhstani healthcare setting. *Clinical and Experimental Obstetrics and Gynecology*, 48(3), 670-675. doi:10.31083/j.ceog.2021.03.2510
- Ainayev, Y., Zhanbyrbekuly, U., Gaipov, A., Suleiman, M., Kadyrzhanuly, K., Kissamedenov, N., . . . Khairli, G. (2021). Surgical reconstruction of penile curvature due to peyronie's disease by plaque incision and buccal mucosa graft. *Journal of Sexual Medicine*, 18(7), 1308-1316. doi:10.1016/j.jsxm.2021.04.009
- Akbar, Z., Alquwez, N., Alsolais, A., Thazha, S. K., Ahmad, M. D., & Cruz, J. P. (2021). Knowledge about antibiotics and antibiotic resistance among health-related students in a saudi university. *Journal of Infection in Developing Countries*, 15(7), 925-933. doi:10.3855/jidc.12329
- Akbay, B., Abidi, S. H., Ibrahim, M. A. A., Mukhatayev, Z., & Ali, S. (2021). Multi-subunit sars-cov-2 vaccine design using evolutionarily conserved t-and b-cell epitopes. *Vaccines*, 9(7) doi:10.3390/vaccines9070702
- Akhanova, G., Nadeem, A., Kim, J. R., Azhar, S., & Khalfan, M. (2021). Building information modeling based building sustainability assessment framework for kazakhstan. *Buildings*, 11(9) doi:10.3390/buildings11090384
- Akhmetzhan, A., Abeu, N., Longinos, S. N., Tashenov, A., Myrzakhmetova, N., Amangeldi, N., . . . Toktarbay, Z. (2021). Synthesis and heavy-metal sorption studies of n,n-dimethylacrylamide-based hydrogels. *Polymers*, 13(18) doi:10.3390/polym13183084
- Akmanova, A., Nurlan, N., Han, S., & Lee, W. (2021). Advances in the enhanced removal of aqueous hg(II) by metallic catalysts: A review. *Current Opinion in Chemical Engineering*, 33 doi:10.1016/j.coche.2021.100704

- Albooyeh, A., Dadrasi, A., Hamed Mashhadzadeh, A., & Saeb, M. R. (2021). Theory for designing mechanically stable single- and double-walled SiGe nanopeapods. *Journal of Molecular Modeling*, 27(7) doi:10.1007/s00894-021-04837-7
- Albougami, A. S. B., Almazan, J. U., Stitt, N., P. Cruz, J., C. Colet, P., & Adolfo, C. S. (2021). Challenges of nurses and care management of depressed older adults: A narrative literature review. *Scandinavian Journal of Caring Sciences*, 35(3), 710-721. doi:10.1111/scs.12908
- Almasbekkyzy, A., Abdikerim, D., Nabi, D., Abdallah, Y. O., & Shehab, E. (2021). Digital maturity and readiness model for multiple-case of kazakhstan large companies. Paper presented at the SIST 2021 - 2021 IEEE International Conference on Smart Information Systems and Technologies, doi:10.1109/SIST50301.2021.9465912 Retrieved from www.scopus.com
- Al-Obaidy, S. S. M., Greenway, G. M., & Paunov, V. N. (2021). Enhanced antimicrobial action of chlorhexidine loaded in shellac nanoparticles with cationic surface functionality. *Pharmaceutics*, 13(9) doi:10.3390/pharmaceutics13091389
- Alshehry, A. S., Cruz, J. P., Alquwez, N., Alsharari, A. F., Tork, H. M. M., Almazan, J. U., . . . Balay-Odao, E. (2021). Predictors of nursing students' intention to receive COVID-19 vaccination: A multi-university study in saudi arabia. *Journal of Advanced Nursing*, doi:10.1111/jan.15002
- Anandakumar, N. N., Hashmi, M. S., & Tehranipoor, M. (2021). FPGA-based physical unclonable functions: A comprehensive overview of theory and architectures. *Integration*, 81, 175-194. doi:10.1016/j.vlsi.2021.06.001
- Armaghani, D. J., Yagiz, S., Mohamad, E. T., & Zhou, J. (2021). Prediction of TBM performance in fresh through weathered granite using empirical and statistical approaches. *Tunnelling and Underground Space Technology*, 118 doi:10.1016/j.tust.2021.104183
- Arzykulov, S., Celik, A., Naurzybayev, G., & Eltawil, A. M. (2021). UAV-assisted cooperative & cognitive NOMA: Deployment, clustering, and resource allocation. *IEEE Transactions on Cognitive Communications and Networking*, doi:10.1109/TCCN.2021.3105133
- Ashyralyev, A., Kalmenov, T. S., Ruzhansky, M. V., Sadybekov, M. A., & Suragan, D. (2021). Preface. *Springer Proceedings in Mathematics and Statistics*, 351, v-vi. Retrieved from www.scopus.com
- Assanov, D., Kerimray, A., Batkeyev, B., & Kapsalyamova, Z. (2021). The effects of COVID-19-related driving restrictions on air quality in an industrial city. *Aerosol and Air Quality Research*, 21(9) doi:10.4209/aaqr.200663
- Atakhanova, Z. (2021). Kazakhstan's oil boom, diversification strategies, and the service sector. *Mineral Economics*, 34(3), 399-409. doi:10.1007/s13563-021-00275-2
- Ayaya, G., Makoelle, T. M., & Van Der Merwe, M. (2021). Developing a framework for inclusion: A case of a full-service school in south africa. *International Journal of Qualitative Studies in Education*, doi:10.1080/09518398.2021.1956616
- Babenko, D., Seidullayeva, A., Bayesheva, D., Turdalina, B., Omarkulov, B., Almabayeva, A., . . . Kozhakhmetov, S. (2021). Ability of procalcitonin and C-reactive protein for discriminating between bacterial and enteroviral meningitis in children using decision tree. *BioMed Research International*, 20 21 doi:10.1155/2021/5519436
- Babi, A., Issa, T., Issanov, A., Akilzhanova, A., Nurgaliyeva, K., Abugaliyeva, Z., . . . Aimagambetova, G. (2021). Prevalence of high-risk human papillomavirus infection among kazakhstani women attending gynecological outpatient clinics. *International Journal of Infectious Diseases*, 109, 8-16. doi:10.1016/j.ijid.2021.06.006
- Babich, I. M., Omarova, V. K., Baratova, A. A., & Churkina, N. I. (2021). Integration of IBL and CLIL in preparing prospective teachers for teaching natural sciences in multilingual environment. *Integration of Education*, 25(2), 304-320. doi:10.15507/1991-9468.103.026.202102.304-320
- Badanova, N., Perveen, A., & Talamona, D. (2021). Concise review on pattern making process in rapid investment casting: Technology, materials & numerical modelling aspect. *Advances in Materials and Processing Technologies*, doi:10.1080/2374068X.2021.1959113
- Baidilov, D., Hayrapetyan, D., & Khalimon, A. Y. (2021). Recent advances in homogeneous base-metal-catalyzed transfer hydrogenation reactions. *Tetrahedron*, doi:10.1016/j.tet.2021.132435
- Baimukashev, D., Rakhim, B., Rubagotti, M., & Varol, H. A. (2021). End-to-end deep fault tolerant control. *IEEE/ASME Transactions on Mechatronics*, doi:10.1109/TMECH.2021.3100150
- Banerjee, D., Hashmi, M., & Ghannouchi, F. (2021). Flexible ultra-high transformation ratio-based dual-band impedance transformer and its applications in a T-junction power divider. *IET Microwaves, Antennas and Propagation*, 15(12), 1553-1563. doi:10.1049/mia2.12138



- Bapayeva, G., Aimagambetova, G., Issanov, A., Terzic, S., Ukybassova, T., Aldiyarova, A., . . . Terzic, M. (2021). The effect of stress, anxiety and depression on in vitro fertilization outcome in kazakhstani public clinical setting: A cross-sectional study. *Journal of Clinical Medicine*, 10(5), 1-10. doi:10.3390/jcm10050937
- Barakbayeva, T., & Demirci, M. F. (2021). Fully automatic CNN design with inception blocks. Paper presented at the Proceedings of SPIE - the International Society for Optical Engineering, , 11878 doi:10.1117/12.2601117 Retrieved from www.scopus.com
- Barral, N., Maleki, M., Madani, N., Cánovas, M., Husillos, R., & Castillo, E. (2021). Spatio-temporal geostatistical modelling of sulphate concentration in the area of the reocín mine (spain) as an indicator of water quality. *Environmental Science and Pollution Research*, doi:10.1007/s11356-021-16475-w
- Barth, M. E., Gee, K. H., Israeli, D., & Kasznik, R. (2021). Stock price management and share issuance: Evidence from equity warrants. *Accounting Review*, 96(5), 31-52. doi:10.2308/TAR-2017-0675
- Bayramov, E., Buchroithner, M., Kada, M., & Zhuniskenov, Y. (2021). Quantitative assessment of vertical and horizontal deformations derived by 3d and 2d decompositions of insar line-of-sight measurements to supplement industry surveillance programs in the tengiz oilfield (kazakhstan). *Remote Sensing*, 13(13) doi:10.3390/rs13132579
- Begehr, H., & Shupeyeva, B. (2021). Polyanalytic boundary value problems for planar domains with harmonic green function. *Analysis and Mathematical Physics*, 11(3) doi:10.1007/s13324-021-00569-2
- Bekzhanova, Z., Memon, S. A., & Kim, J. R. (2021). Self-sensing cementitious composites: Review and perspective. *Nanomaterials*, 11(9) doi:10.3390/nano11092355
- Benassi, E., & Fan, H. (2021). p-block heterobenzenes: Recurring features in structural, vibrational, electronic and topological properties. *Journal of Molecular Structure*, 1245 doi:10.1016/j.molstruc.2021.131258
- Benassi, E., & Fan, H. (2021). Rotamerism and intramolecular interactions of n-propyl halides and their partially and fully fluorinated derivatives. electronic structure, topology and vibrational spectroscopy. *Journal of Molecular Liquids*, doi:10.1016/j.molliq.2021.116943
- Benassi, E., Vaganova, T., Malykhin, E., & Fan, H. (2021). Impact of fluorination and chlorination on the electronic structure, topology and in-plane ring normal modes of pyridines. *Physical Chemistry Chemical Physics*, 23(34), 18958-18974. doi:10.1039/d1cp02342j
- Beni, M. D., & Northoff, G. (2021). Structures in physics and neuroscience: Structural realism and the unity of science. *Axiomathes*, 31(4), 479-495. doi:10.1007/s10516-020-09493-9
- Berger, H., Risvold, W., & Fuqua, J. B. (2021). Couch city: Socrates against simonides. *Couch city: Socrates against simonides* (pp. 1-186) Retrieved from www.scopus.com
- Berkinova, Z., Yermukhambetova, A., & Golman, B. (2021). Simulation of flow properties of differently shaped particles using the discrete element method. *Computer Applications in Engineering Education*, 29(5), 1061-1070. doi:10.1002/cae.22359
- Bijnens, G., Konings, J., & Vanormelingen, S. (2021). The impact of electricity prices on european manufacturing jobs. *Applied Economics*, doi:10.1080/00036846.2021.1951647
- Blasco, O., Karapetyants, A., & Restrepo, J. E. (2021). Boundedness of composition operators in holomorphic hölder type spaces. *Mathematical Methods in the Applied Sciences*, doi:10.1002/mma.7650
- Boranbayev, A., Baidyussenov, R., & Mazhitov, M. (2021). Development and design of a library information system intended for automation of processes in higher education institution doi:10.1007/978-3-030-80129-8\_31 Retrieved from www.scopus.com
- Boranbayev, A., Boranbayev, S., Baimukhamedov, M., & Nurbekov, A. (2021). Mathematical model to support decision-making to ensure the efficiency and stability of economic development of the republic of kazakhstan doi:10.1007/978-3-030-80126-7\_4 Retrieved from www.scopus.com
- Boshkayev, K., Konysbayev, T., Luongo, O., Muccino, M., & Pace, F. (2021). Testing generalized logotropic models with cosmic growth. *Physical Review D*, 104(2) doi:10.1103/PhysRevD.104.023520
- Boukarou, A., da Silva, D. O., Guerbati, K., & Zennir, K. (2021). Global well-posedness for the fifth-order kadmetshev-petviashvili ii equation in anisotropic gevrey spaces. *Dynamics of Partial Differential Equations*, 18(2), 101-112. doi:10.4310/DPDE.2021.v18.n2.a2
- Broomandi, P., Jahanbakhshi, A., Nikfal, A., Kim, J. R., & Karaca, F. (2021). Impact assessment of beirut explosion on local and regional air quality. *Air Quality, Atmosphere and Health*, doi:10.1007/s11869-021-01066-y

- Broomandi, P., Tleuken, A., Zhaxylykov, S., Nikfal, A., Kim, J. R., & Karaca, F. (2021). Assessment of potential benefits of traffic and urban mobility reductions during COVID-19 lockdowns: Dose-response calculations for material corruptions on built cultural heritage. *Environmental Science and Pollution Research*, doi:10.1007/s11356-021-16078-5
- Burkhanov, A. (2021). Authoritarian policy styles post-soviet central asia. *The routledge handbook of policy styles* (pp. 63-74) doi:10.4324/9780429286322-8 Retrieved from www.scopus.com
- Burster, T., Traut, R., Yermekyzy, Z., Mayer, K., Westhoff, M. -, Bischof, J., & Knippschild, U. (2021). Critical view of novel treatment strategies for glioblastoma: Failure and success of resistance mechanisms by glioblastoma cells. *Frontiers in Cell and Developmental Biology*, 9 doi:10.3389/fcell.2021.695325
- Cerone, A., & Ölveczky, P. C. (2021). Preface Retrieved from www.scopus.com
- Cha, M., Alqahtani, N. B., Yin, X., Wang, L., Yao, B., Kneafsey, T. J., . . . Wu, Y. -. (2021). Propagation of cryogenic thermal fractures from unconfined pmma boreholes. *Energies*, 14(17) doi:10.3390/en14175433
- Chattopadhyay, P., Pandit, T., Mitra, A., & Paul, G. (2021). Quantum cycle in relativistic non-commutative space with generalized uncertainty principle correction. *Physica A: Statistical Mechanics and its Applications*, 584 doi:10.1016/j.physa.2021.126365
- Chen, K., Qi, K., Zhou, T., Yang, T., Zhang, Y., Guo, Z., . . . Prasad, P. N. (2021). Water-dispersible CsPbBr<sub>3</sub> perovskite nanocrystals with ultra-stability and its application in electrochemical CO<sub>2</sub> reduction. *Nano-Micro Letters*, 13(1) doi:10.1007/s40820-021-00690-8
- Cheng, C., Messerschmidt, L., Thorvaldsdottir, S., Albrecht, C., Hainz, C., Stitteneder, T., . . . Schenk, C. (2021). Tracking government responses to covid-19: The CoronaNet research project. *CESifo Forum*, 22(3), 47-50. Retrieved from www.scopus.com
- CohenMiller, A., Saniyazova, A., Sandygulova, A., & Izenkova, Z. (2021). Gender equity in STEM higher education in kazakhstan. *Gender equity in STEM in higher education: International perspectives on policy, institutional culture, and individual choice* (pp. 140-157) Retrieved from www.scopus.com
- Dall'agnola, J., & Thibault, H. (2021). Online temptations: Divorce and extramarital affairs in kazakhstan. *Religions*, 12(8) doi:10.3390/rel12080654
- Dauyey, Z., & Poddighe, D. (2021). Diagnostic barriers in children with immunodeficiencies in central asia: A case-based discussion. *Pediatric Reports*, 13(3), 483-489. doi:10.3390/PEDIATRIC13030055
- Demidchik, N. N., Kudaibergenova, M. D., & Kintonova, A. Z. (2021). Using the internet of things (IoT) for natural resources monitoring system. Paper presented at the SIST 2021 - 2021 IEEE International Conference on Smart Information Systems and Technologies, doi:10.1109/SIST50301.2021.9465979 Retrieved from www.scopus.com
- Denissenya, M., Grossan, B., & Linder, E. V. (2021). Distinguishing time clustering of astrophysical bursts. *Physical Review D*, 104(2) doi:10.1103/PhysRevD.104.023007
- Dikhanbayeva, D., Suleiman, Z., Nurmaganbetov, D., Ibraimov, N., Mgbere, C., & Turkyilmaz, A. (2021). Digital transformation of enterprises in emerging economies. Paper presented at the SIST 2021 - 2021 IEEE International Conference on Smart Information Systems and Technologies, doi:10.1109/SIST50301.2021.9465977 Retrieved from www.scopus.com
- Dildabek, A. B., Stamgaliyeva, Z. B., Ilyasova, B. B., Tleukulova, Z. B., Madirov, A. A., Kassenova, S. M., . . . Akbassova, A. Z. (2021). Superinoculation of nicotiana benthiana promotes the development of immunity to tomato bushy stunt virus. *Russian Journal of Plant Physiology*, 68(5), 883-889. doi:10.1134/S102144372104004X
- Dobri, A., Tsiantis, A., Papathanasiou, T. D., & Wang, Y. (2021). Investigation of transient heat transfer in multi-scale PCM composites using a semi-analytical model. *International Journal of Heat and Mass Transfer*, 175 doi:10.1016/j.ijheatmasstransfer.2021.121389
- Dvorackova, H., Tichy, T., & Jochec, M. (2021). How do limit orders affect the disposition effect on highly liquid Markets—Experimental finance evidence. *Journal of Behavioral Finance*, doi:10.1080/15427560.2021.1973006
- Esfahani, A. (2021). Dynamics of solutions of a fractional NLS system with quadratic interaction. *Journal of Mathematical Physics*, 62(8) doi:10.1063/5.0045980
- Féaux de la Croix, J., Arzhantseva, I., Dağyeli, J., Dubuisson, E. -, Härke, H., Penati, B., . . . Wooden, A. (2021). Roundtable studying the anthropocene in central asia: The challenge of sources and scales in human–environment relations. *Central Asian Survey*, doi:10.1080/02634937.2021.1960797

- Flouris, A. D., Babar, Z., Ioannou, L. G., Onarheim, K. H., Phua, K. H., & Hargreaves, S. (2021). Improving the evidence on health inequities in migrant construction workers preparing for big sporting events. *The BMJ*, 374 doi:10.1136/bmj.n1615
- Fooladpanjeh, S., Yousefi, F., Molaei, F., Zarghami Dehaghani, M., Sajadi, S. M., Abida, O., . . . Saeb, M. R. (2021). Thermal conductivity of random polycrystalline BC3 nanosheets: A step towards realistic simulation of 2D structures. *Journal of Molecular Graphics and Modelling*, 107 doi:10.1016/j.jmngm.2021.107977
- Gao, W., Jin, Q., Liu, Y., Zhang, Y., Wang, X., & Bakenov, Z. (2021). Promoting polysulfides redox conversion by sulfur-deficient ZnS<sub>1-x</sub> hollow polyhedrons for lithium-sulfur batteries. *Materials and Design*, 210 doi:10.1016/j.matdes.2021.110060
- Gkotsiopoulou, P., Zorbas, D., & Douligeris, C. (2021). Performance determinants in LoRa networks: A literature review. *IEEE Communications Surveys and Tutorials*, 23(3), 1721-1758. doi:10.1109/COMST.2021.3090409
- González-Touya, M., Carmona, R., & Sarría-Santamera, A. (2021). Evaluating the impact of the diabetes mellitus strategy for the national health system: An interrupted time series analysis. *Healthcare (Switzerland)*, 9(7) doi:10.3390/healthcare9070873
- Goryunov, M., Kokovin, S., & Tabuchi, T. (2021). Continuous spatial monopolistic competition: Matching goods with consumers. *Economic Theory*, doi:10.1007/s00199-021-01380-7
- Grossan, B. (2021). Possible periodic windowed behavior in sgr1935+2154 bursts. *Publications of the Astronomical Society of the Pacific*, 133(1025) doi:10.1088/1538-3873/AC07B1
- Haidar, S., & Manan, S. A. (2021). English in pakistan: Language policy, features and present-day use. *English in east and south asia: Policy, features and language in use* (pp. 242-255) doi:10.4324/9780429433467-17 Retrieved from www.scopus.com
- Hajar, A., & Mhamed, A. A. S. (2021). Investigating language identities of international postgraduate students in britain: A qualitative inquiry. *Journal of Multilingual and Multicultural Development*, doi:10.1080/01434632.2021.1946549
- Harbers, L., Agostini, F., Nicos, M., Poddighe, D., Bienko, M., & Crosetto, N. (2021). Somatic copy number alterations in human cancers: An analysis of publicly available data from the cancer genome atlas. *Frontiers in Oncology*, 11 doi:10.3389/fonc.2021.700568
- Hayrapetyan, D., & Stepanova, V. (2021). Facile synthesis of spirocyclic lactams via [3+2] and [3+3] aza-annulation reactions. *European Journal of Organic Chemistry*, 2021(14), 2121-2125. doi:10.1002/ejoc.202100255
- Hazlett, R. D., Farooq, U., & Babu, D. K. (2021). A complement to decline curve analysis. *SPE Journal*, 26(4), 2468-2478. doi:10.2118/205390-PA
- He, J. -, Nurakhmetov, D., Skrzypacz, P., & Wei, D. (2021). Dynamic pull-in for micro-electromechanical device with a current-carrying conductor. *Journal of Low Frequency Noise Vibration and Active Control*, 40(2), 1059-1066. doi:10.1177/1461348419847298
- Hendy, A. S., Zaky, M. A., & Abbaszadeh, M. (2021). Long time behavior of robin boundary sub-diffusion equation with fractional partial derivatives of caputo type in differential and difference settings. *Mathematics and Computers in Simulation*, 190, 1370-1378. doi:10.1016/j.matcom.2021.07.006
- Hernández-Torrano, D., & Courtney, M. G. R. (2021). Modern international large-scale assessment in education: An integrative review and mapping of the literature. *Large-Scale Assessments in Education*, 9(1) doi:10.1186/s40536-021-00109-1
- Hornyák, I., Nasiri, S., Bubin, S., & Adamowicz, L. (2021). S 2 rydberg spectrum of the boron atom. *Physical Review A*, 104(3) doi:10.1103/PhysRevA.104.032809
- Huang, S., & Abedinia, O. (2021). Investigation in economic analysis of microgrids based on renewable energy uncertainty and demand response in the electricity market. *Energy*, 225 doi:10.1016/j.energy.2021.120247
- Hulsey, N. L. (2021). Alan watts and the infinite game: Playing everything. The relevance of alan watts in contemporary culture: Understanding contributions and controversies (pp. 57-75) Retrieved from www.scopus.com
- Husain, S., Khusro, A., Hashmi, M., Naurzybayev, G., & Chaudhary, M. A. (2021). Demonstration of CAD deployability for GPR based small-signal modelling of GaN HEMT. Paper presented at the Proceedings - IEEE International Symposium on Circuits and Systems, , 2021-May doi:10.1109/ISCAS51556.2021.9401088 Retrieved from www.scopus.com

- Hwami, M. (2021). The challenge for university teaching and research practice in zimbabwe: An empirical study. *Teaching in Higher Education*, doi:10.1080/13562517.2021.1973411
- Israeli, D., Kasznik, R., & Sridharan, S. A. (2021). Unexpected distractions and investor attention to corporate announcements. *Review of Accounting Studies*, doi:10.1007/s11142-021-09618-4
- Issatayev, N., Nuspeissova, A., Kalimuldina, G., & Bakenov, Z. (2021). Three-dimensional foam-type current collectors for rechargeable batteries: A short review. *Journal of Power Sources Advances*, 10 doi:10.1016/j.powera.2021.100065
- Issilbayeva, A., Kushugulova, A., Meiramova, A., Kozhakhmetov, S., Akhmetova, Z., Nurgaziyev, M., . . . Ainabekova, B. (2021). Epidemiological trends of rheumatoid arthritis and padi4, ptpn22, and hla-drb9 genes distribution in the kazakhstan population. *Open Access Macedonian Journal of Medical Sciences*, 9(B), 747-757. doi:10.3889/oamjms.2021.6472
- Jaeger, M., Nagimova, A., & Adair, D. (2021). Perspectives on engineering competencies and competency development approaches - early-career engineers versus managers of engineers. *International Journal of Engineering Education*, 37(3), 769-784. Retrieved from www.scopus.com
- Jarndal, A., Husain, S., & Hashmi, M. (2021). On temperature-dependent small-signal modelling of GaN HEMTs using artificial neural networks and support vector regression. *IET Microwaves, Antennas and Propagation*, 15(8), 937-953. doi:10.1049/mia2.12112
- Jetybayeva, A., Uzakbaiuly, B., Mukanova, A., Myung, S. -, & Bakenov, Z. (2021). Erratum: Recent advancements in solid electrolytes integrated into all-solid-state 2D and 3D lithium-ion microbatteries (*J. mater. chem. A* (2021) 9 (15140-15178) DOI: 10.1039/D1TA02652F). *Journal of Materials Chemistry A*, 9(32), 17553. doi:10.1039/d1ta90162a
- Jetybayeva, A., Uzakbaiuly, B., Mukanova, A., Myung, S. -, & Bakenov, Z. (2021). Recent advancements in solid electrolytes integrated into all-solid-state 2D and 3D lithium-ion microbatteries. *Journal of Materials Chemistry A*, 9(27), 15140-15178. doi:10.1039/d1ta02652f
- Ju, H., & Lee, D. (2021). Nonlinear analysis of reinforced concrete members subjected to combined torsion and bending moment. *ACI Structural Journal*, 118(4), 55-70. doi:10.14359/51732643
- Ju, H., Yerzhanov, M., Serik, A., Lee, D., & Kim, J. R. (2021). Statistical and reliability study on shear strength of recycled coarse aggregate reinforced concrete beams. *Materials*, 14(12) doi:10.3390/ma14123321
- Kabdrakhmanova, M., Memon, S. A., & Saurbayeva, A. (2021). Implementation of the panel data regression analysis in PCM integrated buildings located in a humid subtropical climate. *Energy*, 237 doi:10.1016/j.energy.2021.121651
- Kadyrov, S., Kashkynabayev, A., Skrzypacz, P., Kaloudis, K., & Bountis, A. (2021). Periodic solutions and the avoidance of pull-in instability in nonautonomous microelectromechanical systems. *Mathematical Methods in the Applied Sciences*, doi:10.1002/mma.7725
- Kadyrsizova, Z., Kenkel, J., Page, J., Singh, J., Smith, K. E., Vraciu, A., & Witt, E. E. (2021). Cubic surfaces of characteristic two. *Transactions of the American Mathematical Society*, 374(9), 6251-6267. doi:10.1090/tran/8341
- Kalendar, R., Kospanova, D., & Schulman, A. H. (2021). Transposon-based tagging in silico using FastPCR software doi:10.1007/978-1-0716-1134-0\_23 Retrieved from www.scopus.com
- Kalendar, R., Shustov, A. V., & Schulman, A. H. (2021). Palindromic sequence-targeted (PST) PCR, version 2: An advanced method for high-throughput targeted gene characterization and transposon display. *Frontiers in Plant Science*, 12 doi:10.3389/fpls.2021.691940
- Kanafin, Y. N., Satayeva, A., Arkhangelsky, E., & Pouloupoulos, S. G. (2021). Treatment of a biological effluent containing metronidazole. *Chemical Engineering Transactions*, 86, 595-600. doi:10.3303/CET2186100
- Karakaş, S., Kaya, C., Schäfer, S. D., Mikuš, M., Terzic, M., Abdullaev, B., & Andrisani, A. (2021). Fertility-sparing in cancer patients. *Clinical and Experimental Obstetrics and Gynecology*, 48(4), 787-794. doi:10.31083/j.ceog4804126
- Karimov, S., & Konings, J. (2021). How lockdown causes a missing generation of start-ups and jobs. *International Economics and Economic Policy*, doi:10.1007/s10368-021-00513-6
- Kasa, R., Ait Si Mhamed, A., Ibrasheva, A., Mambetalina, D., & Ivatov, S. (2021). Factors motivating the transfer of university students in kazakhstan. *Central Asian Survey*, doi:10.1080/02634937.2021.1965087
- Kashkynbayev, A., & Mustafa, M. (2021). Basic theory of impulsive quaternion-valued linear systems. Paper presented at the Springer Proceedings in Mathematics and Statistics, , 351 273-287. doi:10.1007/978-3-030-69292-6\_21 Retrieved from www.scopus.com

- Kashkynbayev, A., & Rihan, F. A. (2021). Dynamics of fractional-order epidemic models with general nonlinear incidence rate and time-delay. *Mathematics*, 9(15) doi:10.3390/math9151829
- Kassen, M. (2021). Understanding decentralized civic engagement: Focus on peer-to-peer and blockchain-driven perspectives on e-participation. *Technology in Society*, 66 doi:10.1016/j.techsoc.2021.101650
- Kassymov, A., & Suragan, D. (2021). Lyapunov-type inequality for fractional sub-laplacians. Paper presented at the Springer Proceedings in Mathematics and Statistics, , 351 91-103. doi:10.1007/978-3-030-69292-6\_6 Retrieved from www.scopus.com
- Kaumbekova, S., Torkmahalleh, M. A., & Shah, D. (2021). Ammonium sulfate and ultrafine particle affect early onset of alzheimer's disease. *Chemical Engineering Transactions*, 85, 187-192. doi:10.3303/CET2185032
- Kerimkhulle, S., Kerimkulov, Z., Bakhtiyarov, D., Turtayeva, N., & Kim, J. (2021). In-field crop-weed classification using remote sensing and neural network. Paper presented at the SIST 2021 - 2021 IEEE International Conference on Smart Information Systems and Technologies, doi:10.1109/SIST50301.2021.9465970 Retrieved from www.scopus.com
- Kim, Y., Zharkinbekov, Z., Sarsenova, M., Yeltay, G., & Saparov, A. (2021). Recent advances in gene therapy for cardiac tissue regeneration. *International Journal of Molecular Sciences*, 22(17) doi:10.3390/ijms22179206
- Kinyondo, A., Pelizzo, R., & Byaro, M. (2021). "DELIVER AFRICA FROM DEBTS": Good governance alone is not enough to save the continent from debt onslaught. *World Affairs*, 184(3), 318-338. doi:10.1177/00438200211025519
- Kobeyev, S., Tokbolat, S., & Durdyev, S. (2021). Design and energy performance analysis of a hotel building in a hot and dry climate: A case study. *Energies*, 14(17) doi:10.3390/en14175502
- Kulsharova, G., & Kurmangaliyeva, A. (2021). Liver microphysiological platforms for drug metabolism applications. *Cell Proliferation*, 54(9) doi:10.1111/cpr.13099
- Kurbanova, B. A., Mussabek, G. K., Timoshenko, V. Y., Lysenko, V., & Utegulov, Z. N. (2021). Photothermal effects and heat conduction in nanogranular silicon films. *Nanomaterials*, 11(9) doi:10.3390/nano11092379
- Kurmanbek, B., Erlangga, Y., & Amanbek, Y. (2021). Explicit inverse of near toeplitz pentadiagonal matrices related to higher order difference operators. *Results in Applied Mathematics*, 11 doi:10.1016/j.rinam.2021.100164
- Lee, E. (2021). Integrability of the multi-species tasep with species-dependent rates. *Symmetry*, 13(9) doi:10.3390/sym13091578
- Li, H., Wu, J., Gao, X., Li, T., Zhang, M., Niu, X., . . . Wang, K. (2021). Preparation and performance study of antibacterial materials based on GO-TiO<sub>2</sub>. *ChemistrySelect*, 6(31), 7880-7886. doi:10.1002/slct.202101404
- Lim, M., & Xenarios, S. (2021). Economic assessment of urban space and blue-green infrastructure in singapore. *Journal of Urban Ecology*, 7(1) doi:10.1093/jue/juab020
- Liu, C., Song, L., Van Meervelt, L., Peshkov, V. A., Li, Z., & Van der Eycken, E. V. (2021). Palladium-catalyzed arylative dearomatization and subsequent Aromatization/Dearomatization/Aza-michael addition: Access to zephycarinatine and zephygranditine skeletons. *Organic Letters*, 23(13), 5065-5070. doi:10.1021/acs.orglett.1c01590
- Longinos, S. N., Longinou, D. -, Celebi, E., Toktarbay, Z., & Parlaktuna, M. (2021). Kinetic study of methane hydrate formation with the use of a surface baffle. *Reaction Kinetics, Mechanisms and Catalysis*, doi:10.1007/s11144-021-02058-w
- Lukac, M., & El-Fakih, K. (2021). On distinguishing sequences of several classes of reversible finite state machines. Paper presented at the Proceedings of the International Symposium on Multiple-Valued Logic, , 2021-May 113-119. doi:10.1109/ISMVL51352.2021.00028 Retrieved from www.scopus.com
- Mademikhanov, Y., Otyunshin, A., Shumenov, R., & Rizvi, M. (2021). Automated attendance-checking system using bluetooth. Paper presented at the SIST 2021 - 2021 IEEE International Conference on Smart Information Systems and Technologies, doi:10.1109/SIST50301.2021.9465916 Retrieved from www.scopus.com
- Maham, B., & Svensson, T. (2021). Performance analysis of millimeter wave CoMP networks under blockage. Paper presented at the IEEE Vehicular Technology Conference, , 2021-April doi:10.1109/VTC2021-Spring51267.2021.9448743 Retrieved from www.scopus.com

- Malashenkov, D. V., Dashkova, V., Zhakupova, K., Vorobjev, I. A., & Barteneva, N. S. (2021). Comparative analysis of freshwater phytoplankton communities in two lakes of burabay national park using morphological and molecular approaches. *Scientific Reports*, 11(1) doi:10.1038/s41598-021-95223-z
- Maleki, M., Madani, N., & Jélvez, E. (2021). Geostatistical algorithm selection for mineral resources assessment and its impact on open-pit production planning considering metal grade boundary effect. *Natural Resources Research*, doi:10.1007/s11053-021-09928-z
- Mamlin, M., Midlenko, A., Khamzina, S., & Mukazhanov, A. (2021). Massive retroperitoneal and subcutaneous emphysema after transanal excision of rectal cancer. *Case Reports in Oncology*, 14(2), 922-927. doi:10.1159/000516757
- Manabat, A. R. (2021). Bringing MIL into the margins: Introducing media and information literacy at the outskirts. *International Journal of Media and Information Literacy*, 6(1), 156-165. doi:10.13187/IJMIL.2021.1.156
- Manan, S. A., Haidar, S., & Amin, R. U. I. (2021). Beyond market and language commodification: Contemplating social-market value and social-welfare concerns in language education policy and practice in pakistan. *Language and Education*, doi:10.1080/09500782.2021.1955917
- Maradiaga, O. D. H., Mok, P. L., Sivapragasam, G., Samrot, A. V., Ali Khan, M. S., Farhana, A., . . . Subbiah, S. K. (2021). Lipofection of single guide rna targeting mmp8 decreases proliferation and migration in lung adenocarcinoma cells. *Medicina (Lithuania)*, 57(7) doi:10.3390/medicina57070710
- Markhabayeva, A., Abdullin, K., Kalkozova, Z., Nurbolat, S., & Nuraje, N. (2021). Effect of synthesis method parameters on the photocatalytic activity of tungsten oxide nanoplates. *AIP Advances*, 11(9) doi:10.1063/5.0065156
- Massaroni, C., Zaltieri, M., Presti, D. L., Nicolò, A., Tosi, D., & Schena, E. (2021). Fiber bragg grating sensors for cardiorespiratory monitoring: A review. *IEEE Sensors Journal*, 21(13), 14069-14080. doi:10.1109/JSEN.2020.2988692
- Medeuov, D. (2021). Friendship via a bus ride: Urban mobility and social life in nur-sultan, kazakhstan. *Eurasian Geography and Economics*, doi:10.1080/15387216.2021.1954537
- Medeuov, D., Roth, C., Puzyreva, K., & Basov, N. (2021). Appraising discrepancies and similarities in semantic networks using concept-centered subnetworks. *Applied Network Science*, 6(1) doi:10.1007/s41109-021-00408-0
- Meligi, N. M., Dyab, A. K. F., & Paunov, V. N. (2021). Sustained in vitro and in vivo delivery of metformin from plant pollen-derived composite microcapsules. *Pharmaceutics*, 13(7) doi:10.3390/pharmaceutics13071048
- Mello, H. L. (2021). Innovation diffusion, social capital, and mask mobilization: Culture change during the COVID-19 pandemic. *COVID-19: Two volume set (pp. Vol2: 134-Vol2: 151)* doi:10.4324/9781003142065-14 Retrieved from www.scopus.com
- Mirasbekov, Y., Abdimanova, A., Sarkyrbayev, K., Samarkhanov, K., Abilkas, A., Potashnikova, D., . . . Barteneva, N. S. (2021). Combining imaging flow cytometry and molecular biological methods to reveal presence of potentially toxic algae at the ural river in kazakhstan. *Frontiers in Marine Science*, 8 doi:10.3389/fmars.2021.680482
- Mitra, A., Zarikas, V., Bonanno, A., Good, M., & Güdekli, E. (2021). Constraining the swiss-cheese IR-fixed point cosmology with cosmic expansion. *Universe*, 7(8) doi:10.3390/universe7080263
- Molaei, F., Zarghami Dehaghani, M., Salmankhani, A., Fooladpanjeh, S., Sajadi, S. M., Esmaeili Safa, M., . . . Saeb, M. R. (2021). Applying molecular dynamics simulation to take the fracture fingerprint of polycrystalline SiC nanosheets. *Computational Materials Science*, 200 doi:10.1016/j.commatsci.2021.110770
- Molkenova, A., Sarsenov, S., Atabaev, S., Khamkhash, L., & Atabaev, T. S. (2021). Hierarchically-structured hollow CuO microparticles for efficient photo-degradation of a model pollutant dye under the solar light illumination. *Environmental Nanotechnology, Monitoring and Management*, 16 doi:10.1016/j.enmm.2021.100507
- Morawska, L., Zhu, T., Liu, N., Amouei Torkmahalleh, M., de Fatima Andrade, M., Barratt, B., . . . Ye, C. (2021). The state of science on severe air pollution episodes: Quantitative and qualitative analysis. *Environment International*, 156 doi:10.1016/j.envint.2021.106732
- Mossa, M. A., Do, T. D., Echeikh, H., & Diab, A. A. Z. (2021). A new formula of predictive control for an induction motor: Comparative study with MP DTC. Paper presented at the Proceedings of the Energy Conversion Congress and Exposition - Asia, ECCE Asia 2021, 1498-1504. doi:10.1109/ECCE-Asia49820.2021.9479267 Retrieved from www.scopus.com

- Mossa, M. A., Do, T. D., Echeikh, H., & Diab, A. A. Z. (2021). A predictive voltage control scheme for A variable speed doubly fed induction generator. Paper presented at the Proceedings of the Energy Conversion Congress and Exposition - Asia, ECCE Asia 2021, 1491-1497. doi:10.1109/ECCE-Asia49820.2021.9479146 Retrieved from www.scopus.com
- Mukashev, D., Kairgaliyev, M., Alibekov, U., Oralbayeva, N., & Sandygulova, A. (2021). Facial expression generation of 3D avatar based on semantic analysis. Paper presented at the 2021 30th IEEE International Conference on Robot and Human Interactive Communication, RO-MAN 2021, 89-94. doi:10.1109/RO-MAN50785.2021.9515463 Retrieved from www.scopus.com
- Mukhatayeva, A., Mustafa, A., Dzissyuk, N., Issanov, A., Bayserkin, B., Vermund, S. H., & Ali, S. (2021). Author correction: Hepatitis B, hepatitis C, tuberculosis and sexually-transmitted infections among HIV positive patients in kazakhstan (scientific reports, (2021), 11, 1, (13542), 10.1038/s41598-021-92688-w). Scientific Reports, 11(1) doi:10.1038/s41598-021-97673-x
- Mukhatayeva, A., Mustafa, A., Dzissyuk, N., Issanov, A., Bayserkin, B., Vermund, S. H., & Ali, S. (2021). Hepatitis B, hepatitis C, tuberculosis and sexually-transmitted infections among HIV positive patients in kazakhstan. Scientific Reports, 11(1) doi:10.1038/s41598-021-92688-w
- Mukhmetov, O., Mashekova, A., Zhao, Y., Midlenko, A., Ng, E. Y. K., & Fok, S. C. (2021). Patient/breast-specific detection of breast tumor based on patients' thermograms, 3d breast scans, and reverse thermal modelling. Applied Sciences (Switzerland), 11(14) doi:10.3390/app11146565
- Mulikova, T., Bekkhozhin, Z., Abdirassil, A., & Utepbergenov, D. (2021). A continuous spectrophotometric assay for glutathione-independent glyoxalases. Analytical Biochemistry, 630 doi:10.1016/j.ab.2021.114317
- Murphy, C. G. (2021). The Lord's justice: Blood libel, legalism, and neighborly negotiation in an eighteenth-century private town. Jewish History, doi:10.1007/s10835-021-09415-1
- Mustafa, M., & Suragan, D. (2021). A note on hardy type inequalities for quaternion-valued functions. Siberian Electronic Mathematical Reports, 18, 338-344. doi:10.33048/semi.2021.18.023
- Nanovsky, S. (2021). A new test for optimum currency area with an application to the central and eastern european countries. Applied Economics, doi:10.1080/00036846.2021.1962512
- Narzilloev, B., Malafarina, D., Abdubabbarov, A., Ahmedov, B., & Bambi, C. (2021). Particle motion around a static axially symmetric wormhole. Physical Review D, 104(6) doi:10.1103/PhysRevD.104.064016
- Nawaz, T., Afzal, M., & Wahab, A. (2021). Scattering analysis of a flexible trifurcated lined waveguide structure with step-discontinuities. Physica Scripta, 96(11) doi:10.1088/1402-4896/ac169e
- Nemati, M., Maham, B., Pokhrel, S. R., & Choi, J. (2021). Modeling RIS empowered outdoor-to-indoor communication in mmWave cellular networks. IEEE Transactions on Communications, doi:10.1109/TCOMM.2021.3104878
- Ng, A., Jumabekov, A. N., Yang, S., Zapien, J. A., & Surya, C. (2021). Editorial: Advances in perovskite materials for optoelectronic applications. Frontiers in Materials, 8 doi:10.3389/fmats.2021.717830
- Ngwenya, N., Makoelle, T. M., & van der Merwe, M. (2021). Participatory action research as change strategy: A case of developing inclusive teaching and learning practices in an adult education centre in gauteng east district of south africa. Interchange, 52(3), 393-414. doi:10.1007/s10780-021-09435-3
- Nishikawa, Y., Fukaya, T., Fukui, T., Uto, T., Takagi, H., Nasu, J., . . . Sato, K. (2021). Congenital deficiency of conventional dendritic cells promotes the development of atopic dermatitis-like inflammation. Frontiers in Immunology, 12 doi:10.3389/fimmu.2021.712676
- Nurbossynova, S., Sautbekov, A., Zholdaskhan, B., Abdallah, Y., & Shehab, E. (2021). Critical success factors of digitalization of kazakhstan manufacturing industry. Paper presented at the SIST 2021 - 2021 IEEE International Conference on Smart Information Systems and Technologies, doi:10.1109/SIST50301.2021.9465926 Retrieved from www.scopus.com
- Nurmakanov, Y., Kalimuldina, G., Naurzybayev, G., Adair, D., & Bakenov, Z. (2021). Structural and chemical modifications towards high-performance of triboelectric nanogenerators. Nanoscale Research Letters, 16(1) doi:10.1186/s11671-021-03578-z
- Olaifa, K., Nikodinovic-Runic, J., Glišić, B., Boschetto, F., Marin, E., Segreto, F., & Marsili, E. (2021). Electroanalysis of candida albicans biofilms: A suitable real-time tool for antifungal testing. Electrochimica Acta, 389 doi:10.1016/j.electacta.2021.138757
- Omarov, O., Naurzybayev, G., Arzykulov, S., Eltawil, A. M., & Hashmi, M. S. (2021). Outage analysis of EH-based cooperative NOMA networks over generalized statistical models. Paper presented at the IEEE Vehicular Technology Conference, , 2021-April doi:10.1109/VTC2021-Spring51267.2021.9448642 Retrieved from www.scopus.com

- Onarheim, K. H., Phua, K. H., Babar, Z. R., Flouris, A. D., & Hargreaves, S. (2021). Health and social needs of migrant construction workers for big sporting events. *The BMJ*, 374 doi:10.1136/bmj.n1591
- Ozhmegov, K., Kawalek, A., Garbicz, D., Dya, H., & Arbuz, A. (2021). Development of alternative method for manufacturing structural zirconium elements for nuclear engineering. *Materials*, 14(17) doi:10.3390/ma14175006
- Pelizzo, R., & Knox, C. (2021). 'Sobriety, human dignity and public morality': Ethical standards in kazakhstan. *Public Money and Management*, doi:10.1080/09540962.2021.1948671
- Plumlee, M. (2021). Sites of silence: Deaf online communication in the time of corona. COVID-19: Two volume set (pp. Vol2: 165-Vol2: 178) doi:10.4324/9781003142065-16 Retrieved from www.scopus.com
- Poddighe, D. (2021). Autoimmune pancreatitis and pancreatic cancer: Epidemiological aspects and immunological considerations. *World Journal of Gastroenterology*, 27(25), 3825-3836. doi:10.3748/wjg.v27.i25.3825
- Pouloupoulos, S. G., Ulykbanova, G., & Philippopoulos, C. J. (2021). Photochemical mineralization of amoxicillin medicinal product by means of UV, hydrogen peroxide, titanium dioxide and iron. *Environmental Technology (United Kingdom)*, 42(19), 2941-2949. doi:10.1080/09593330.2020.1720300
- Prorok, P., Grin, I. R., Matkarimov, B. T., Ishchenko, A. A., Laval, J., Zharkov, D. O., & Saparbaev, M. (2021). Evolutionary origins of DNA repair pathways: Role of oxygen catastrophe in the emergence of DNA glycosylases. *Cells*, 10(7) doi:10.3390/cells10071591
- Puranik, H., Vough, H. C., & Pathki, C. S. (2021). Oops, I did it (again)! the emotional experience, interpersonal responses, and relational consequences of social gaffes in the workplace. *Journal of Organizational Behavior*, doi:10.1002/job.2546
- Pya, Y., Medressova, A., Faizov, L., Kuanyshbek, A., Kaliyev, R., Myrzakhmetova, G., & Fleur, P. L. (2021). Response to the manuscript "ex vivo donor heart preservation in heart transplantation (HTx)—Is this the solution to increase the donor pool?". *Journal of Cardiac Surgery*, doi:10.1111/jocs.15975
- Rashid, A., Perveen, A., & Jahan, M. P. (2021). Understanding novel assisted electrode from a theoretical and experimental perspectives for EDM of aluminum nitride ceramics. *International Journal of Advanced Manufacturing Technology*, 116(9-10), 2959-2973. doi:10.1007/s00170-021-07660-9
- Razbekova, M., Issanov, A., Chan, M. -, Chan, R., Yerezhepov, D., Kozhamkulov, U., . . . Chan, C. -. (2021). Genetic factors associated with obesity risks in a kazakhstani population. *BMJ Nutrition, Prevention and Health*, 4(1), 90-101. doi:10.1136/bmjnph-2020-000139
- Razeghiyadaki, A., Wei, D., Perveen, A., & Zhang, D. (2021). A multi-rheology design method of sheeting polymer extrusion dies based on flow network and the winter-fritz design equation. *Polymers*, 13(12) doi:10.3390/polym13121924
- Remizov, A., Tukaziban, A., Yelzhanova, Z., Junussova, T., & Karaca, F. (2021). Adoption of green building assessment systems to existing buildings under kazakhstani conditions. *Buildings*, 11(8) doi:10.3390/buildings11080325
- Ren, S., Babalola, M. T., Ogbonnaya, C., Hochwarter, W. A., Akemu, O., & Agyemang-Mintah, P. (2021). Employee thriving at work: The long reach of family incivility and family support. *Journal of Organizational Behavior*, doi:10.1002/job.2559
- Restrepo, J. E., & Suragan, D. (2021). Hilfer-type fractional differential equations with variable coefficients. *Chaos, Solitons and Fractals*, 150 doi:10.1016/j.chaos.2021.111146
- Riisla, K., Wendt, H., Babalola, M. T., & Euwema, M. (2021). Building cohesive teams—the role of leaders' bottom-line mentality and behavior. *Sustainability (Switzerland)*, 13(14) doi:10.3390/su13148047
- Rollan, K., & Somerton, M. (2021). Inclusive education reform in kazakhstan: Civil society activism from the bottom-up. *International Journal of Inclusive Education*, 25(10), 1109-1124. doi:10.1080/13603116.2019.1599451
- Rubagotti, M., Incremona, G. P., Raimondo, D. M., & Ferrara, A. (2021). Constrained nonlinear discrete-time sliding mode control based on a receding horizon approach. *IEEE Transactions on Automatic Control*, 66(8), 3802-3809. doi:10.1109/TAC.2020.3024349
- Ryan, J. M. (2021). COVID-19: Global pandemic, societal responses, ideological solutions. COVID-19: Two volume set (pp. Vol1: 1-Vol1: 8) doi:10.4324/9781003142089-1 Retrieved from www.scopus.com
- Ryan, J. M. (2021). COVID-19: Social consequences and cultural adaptations. COVID-19: Two volume set (pp. Vol2: 1-Vol2: 8) doi:10.4324/9781003142065-1 Retrieved from www.scopus.com



- Ryan, J. M. (2021). Covid-19: Volume I: Global pandemic, societal responses, ideological solutions: Covid-19: Volume II: Social consequences and cultural adaptations. COVID-19: Two volume set (pp. 1-605) doi:10.4324/9781003142065 Retrieved from www.scopus.com
- Ryan, J. M. (2021). Preface. COVID-19: Two Volume Set, , Vol2: x-Vol2: xii. Retrieved from www.scopus.com
- Ryan, J. M. (2021). Preface. COVID-19: Two Volume Set, , Vol1: x-Vol1: xi. Retrieved from www.scopus.com
- Ryan, J. M. (2021). The blessings of covid-19 for neoliberalism, nationalism, and neoconservative ideologies. COVID-19: Two volume set (pp. Vol1: 80-Vol1: 93) doi:10.4324/9781003142089-9 Retrieved from www.scopus.com
- Ryan, J. M. (2021). The sars-cov-2 virus and the covid-19 pandemic. COVID-19: Two volume set (pp. Vol1: 9-Vol1: 20) doi:10.4324/9781003142089-2 Retrieved from www.scopus.com
- Ryan, J. M. (2021). The SARS-CoV-2 virus and the covid-19 pandemic. COVID-19: Two volume set (pp. Vol2: 9-Vol2: 20) doi:10.4324/9781003142065-2 Retrieved from www.scopus.com
- Ryan, S., & Lai, K. (2021). Who is a wise person? zhuangzi and epistemological discussions of wisdom. *Philosophy East and West*, 71(3), 665-682. doi:10.1353/pew.2021.0046
- Sadeghi, M., Amini, N., Falahat, R., Sabeti, H., & Madani, N. (2021). Global stochastic seismic inversion using turning bands simulation and co-simulation. *Acta Geophysica*, doi:10.1007/s11600-021-00648-9
- Salimova, R., Pourafshary, P., & Wang, L. (2021). Data-driven analyses of low salinity waterflooding in carbonates. *Applied Sciences (Switzerland)*, 11(14) doi:10.3390/app11146651
- Salmankhani, A., Mousavi Khadem, S. S., Seidi, F., Hamed Mashhadzadeh, A., Zarrintaj, P., Habibzadeh, S., . . . Saeb, M. R. (2021). Adsorption onto zeolites: Molecular perspective. *Chemical Papers*, doi:10.1007/s11696-021-01817-2
- San Isidro, X. (2021). CLIL as a pathway for cross-curricular and translingual classroom practices: A comparative quantitative study on scottish and spanish teachers' views. *Language Teaching Research*, doi:10.1177/136216882111032431
- Saxena, A., Hashmi, M., Banerjee, D., & Chaudhary, M. A. (2021). Theory and design of a flexible two-stage wideband wilkinson power divider. *Electronics (Switzerland)*, 10(17) doi:10.3390/electronics10172168
- Sazonov, V., Abylkassov, R., Tobylbayeva, Z., Saparov, A., Mironova, O., & Poddighe, D. (2021). Case series: Efficacy and safety of hemoadsorption with HA-330 adsorber in septic pediatric patients with cancer. *Frontiers in Pediatrics*, 9 doi:10.3389/fped.2021.672260
- Schamiloglu, U. (2021). Reflections on the islamic literature of the golden horde: On the occasion of the publication of the qalandar-nâme. *Zolotoordynskoe Obozrenie*, 9(2), 264-271. doi:10.22378/2313-6197.2021-9-2.264-271
- Schenk, C. (2021). Producing state capacity through corruption: The case of immigration control in russia. *Post-Soviet Affairs*, 37(4), 303-317. doi:10.1080/1060586X.2021.1955325
- Schenk, C. (2021). Symbolic state imagery, informal state practice. *Labour, mobility and informal practices in russia, central asia and eastern europe: Power, institutions and mobile actors in transnational space* (pp. 175-191) Retrieved from www.scopus.com
- Sekerbayeva, A., Pourafshary, P., & Hashmet, M. R. (2021). Application of anionic surfactant\ engineered water hybrid EOR in carbonate formations: An experimental analysis. *Petroleum*, doi:10.1016/j.petlm.2020.10.001
- Serikbayeva, B., Abdulla, K., & Oskembayev, Y. (2021). State capacity in responding to COVID-19. *International Journal of Public Administration*, 44(11-12), 920-930. doi:10.1080/01900692.2020.1850778
- Shafiee, M., Fedorov, D., Grossan, B., Kizheppatt, V., & Smoot, G. F. (2021). A readout system for microwave kinetic inductance detectors using software defined radios. *Journal of Instrumentation*, 16(7) doi:10.1088/1748-0221/16/07/P07015
- Shaikholla, S., Dikhanbayeva, D., Suleiman, Z., Shehab, E., & Turkyilmaz, A. (2021). Impact of COVID-19 on industry 4.0 implementation: Kazakhstan industry case. Paper presented at the SIST 2021 - 2021 IEEE International Conference on Smart Information Systems and Technologies, doi:10.1109/SIST50301.2021.9466002 Retrieved from www.scopus.com
- Shakeel, M., Samanova, A., Pourafshary, P., & Hashmet, M. R. (2021). Experimental analysis of oil displacement by hybrid engineered water / chemical EOR approach in carbonates. *Journal of Petroleum Science and Engineering*, 207 doi:10.1016/j.petrol.2021.109297

- Sharipov, A. S., & Adoko, A. C. (2021). An approach to estimate coal pillar strength. Paper presented at the IOP Conference Series: Earth and Environmental Science, , 833(1) doi:10.1088/1755-1315/833/1/012136 Retrieved from www.scopus.com
- Shilibekova, D. (2021). Uncertainty type principles for radial derivatives. Paper presented at the Springer Proceedings in Mathematics and Statistics, , 351 249-256. doi:10.1007/978-3-030-69292-6\_19 Retrieved from www.scopus.com
- Skrzypacz, P., Wei, D., Nurakhmetov, D., Kostsov, E. G., Sokolov, A. A., Begzhigitov, M., & Ellis, G. (2021). Analysis of dynamic pull-in voltage and response time for a micro-electro-mechanical oscillator made of power-law materials. *Nonlinear Dynamics*, 105(1), 227-240. doi:10.1007/s11071-021-06653-3
- Smith, B. (2021). Civilian casualty mitigation and the rationalization of killing. *Journal of Military Ethics*, 20(1), 47-66. doi:10.1080/15027570.2021.1949783
- Smith, B. (2021). Hannah arendt on anti-black racism, the public realm, and higher education. *Educational Philosophy and Theory*, doi:10.1080/00131857.2021.1978071
- Solovan, M. M., Parkhomenko, H. P., Brus, V. V., Mostovyi, A. I., & Maryanchuk, P. D. (2021). Influence of the NaCl dielectric layer on the electrical properties of Graphite/n-Cd1-xZnxTe schottky diodes fabricated by transferring drawn graphite. [Вплив діелектричного шару NaCl на електричні властивості діодів Шоттки графіт/n-Cd1-xZnxTe, виготовлених шляхом перенесення нарисованої плівки графіту на підкладки] *Journal of Nano- and Electronic Physics*, 13(4), 1-4. doi:10.21272/jnep.13(4).04008
- Soltabayev, B., Çağırtekin, A. O., Mentbayeva, A., Yıldırım, M. A., & Acar, S. (2021). Investigation of indium insertion effects on morphological, optical, electrical impedance and modulus properties of ZnO thin films. *Thin Solid Films*, 734 doi:10.1016/j.tsf.2021.138846
- Somerton, M., Helmer, J., Kasa, R., Hernández-Torrano, D., & Makoelle, T. M. (2021). Defining spaces: Resource centres, collaboration, and inclusion in kazakhstan. *Journal of Educational Change*, 22(3), 315-334. doi:10.1007/s10833-020-09384-1
- Sonnenberg-Riethmacher, E., Miehe, M., & Riethmacher, D. (2021). Periostin in allergy and inflammation. *Frontiers in Immunology*, 12 doi:10.3389/fimmu.2021.722170
- Soroush, M., Roostaei, M., Hosseini, S. A., Mohammadtabar, M., Pourafshary, P., Mahmoudi, M., . . . Fattahpour, V. (2021). Challenges and potentials for sand and flow control and management in the sandstone oil fields of kazakhstan: A literature review. *SPE Drilling and Completion*, 36(1), 208-231. doi:10.2118/199247-PA
- Spitas, C., Dwaikat, M. S., & Spitas, V. (2021). Effect of the elastic hysteresis term formulation and response to non-harmonic periodic excitations of a non-linear SDOF dynamical model with weak frequency-dependency in the time domain. *Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science*, doi:10.1177/095440622111018252
- Sullivan, C. J. (2021). BATTLE AT THE BORDER: AN ANALYSIS OF THE 2021 KYRGYZSTAN-TAJIKISTAN CONFLICT. *Asian Affairs*, 52(3), 529-535. doi:10.1080/03068374.2021.1940587
- Sun, F., Mu, C., Kwok, H. F., Xu, J., Wu, Y., Liu, W., . . . Xie, Y. (2021). Capivasertib restricts sars-cov-2 cellular entry: A potential clinical application for covid-19. *International Journal of Biological Sciences*, 17(9), 2348-2355. doi:10.7150/ijbs.57810
- Sun, H., Liu, S., Cao, K., Yu, D., Memon, S. A., Liu, W., . . . Zhao, D. (2021). Degradation mechanism of cement mortar exposed to combined sulfate-chloride attack under cyclic wetting-drying condition. *Materials and Structures/Materiaux Et Constructions*, 54(4) doi:10.1617/s11527-021-01734-6
- Tariga, J. A., dela Rosa, R., & Almazan, J. (2021). Effectiveness of pediatric learning modules in enhancing competencies among nurses in a specialized unit. *Nursing Forum*, doi:10.1111/nuf.12651
- Tariq, H. B., Rajakumar, C., Zhang, D., & Spitas, C. (2021). Finite element modelling and simulation of the hysteretic behaviour of single- and bi-metal cantilever beams using a modified non-linear beta-damping model. *Journal of Applied and Computational Mechanics*, 7(3), 1663-1675. doi:10.22055/jacm.2021.35420.2651
- Terzic, M., Aimagambetova, G., Kunz, J., Bapayeva, G., Aitbayeva, B., Terzic, S., & Laganà, A. S. (2021). Molecular basis of endometriosis and endometrial cancer: Current knowledge and future perspectives. *International Journal of Molecular Sciences*, 22(17) doi:10.3390/ijms22179274
- Timoumi, A., Singh, N., & Kumar, S. (2021). Is your retailer a friend or foe: When should the manufacturer allow its retailer to refurbish? *Production and Operations Management*, doi:10.1111/poms.13548

- Tokazhanov, G., Han, S., & Lee, W. (2021). Enhanced catalytic reduction of p-nitrophenol by nano zerovalent iron - supported metal catalysts. *Catalysis Communications*, 158 doi:10.1016/j.catcom.2021.106337
- Tokazhanov, G., Tleuken, A., Durdyev, S., Otesh, N., Guney, M., Turkyilmaz, A., & Karaca, F. (2021). Stakeholder based weights of new sustainability indicators providing pandemic resilience for residential buildings. *Sustainable Cities and Society*, 75 doi:10.1016/j.scs.2021.103300
- Tong, W., Yu, J., Wu, Q., Hu, L., Tabys, D., Wang, Y., . . . Bennetzen, J. L. (2021). Black tea quality is highly affected during processing by its leaf surface microbiome. *Journal of Agricultural and Food Chemistry*, 69(25), 7115-7126. doi:10.1021/acs.jafc.1c01607
- Turganbayev, Y., Adilgazinov, G., Barabanova, Y., Zhakupov, A., & Zhukibayeva, G. (2021). Information system for vocational guidance, employment and the forecasting of labor demand: The case of kazakhstan. Paper presented at the SIST 2021 - 2021 IEEE International Conference on Smart Information Systems and Technologies, doi:10.1109/SIST50301.2021.9465984 Retrieved from www.scopus.com
- Tursynbek, I., & Shintemirov, A. (2021). Infinite rotational motion generation and analysis of a spherical parallel manipulator with coaxial input axes. *Mechatronics*, 78 doi:10.1016/j.mechatronics.2021.102625
- Uğurlu, K. (2021). A new coherent multivariate average-value-at-risk. *Optimization*, doi:10.1080/02331934.2021.1970755
- Vadera, A. K., & Pathki, C. S. (2021). Competition and cheating: Investigating the role of moral awareness, moral identity, and moral elevation. *Journal of Organizational Behavior*, doi:10.1002/job.2545
- Valagiannopoulos, C., & Kovanis, V. (2021). Injection-locked photonic oscillators: Legacy results and future applications. *IEEE Antennas and Propagation Magazine*, 63(4), 51-59. doi:10.1109/MAP.2020.3021391
- Valizadeh, J., Aghdamigargari, M., Jamali, A., Aickelin, U., Mohammadi, S., Khorshidi, H. A., & Hafezalkotob, A. (2021). A hybrid mathematical modelling approach for energy generation from hazardous waste during the COVID-19 pandemic. *Journal of Cleaner Production*, 315 doi:10.1016/j.jclepro.2021.128157
- Vasilyeva, Y., Chertov, N., Nechaeva, Y., Sboeva, Y., Pystogova, N., Boronnikova, S., & Kalendar, R. (2021). Genetic structure, differentiation and originality of pinus sylvestris l. populations in the east of the east european plain. *Forests*, 12(8) doi:10.3390/f12080999
- Vollbrecht, J., & Brus, V. V. (2021). Effects of recombination order on open-circuit voltage decay measurements of organic and perovskite solar cells. *Energies*, 14(16) doi:10.3390/en14164800
- Vu, V. -, Ngo, V. -, Do, V. -, Truong, D. -, Huynh, T. -, & Do, T. D. (2021). Robust MPPT observer-based control system for wind energy conversion system with uncertainties and disturbance. *IEEE Access*, 9, 96466-96477. doi:10.1109/ACCESS.2021.3094819
- Wang, K., Liang, L., Zheng, Y., Li, H., Niu, X., Zhang, D., & Fan, H. (2021). Visible light-driven photocatalytic degradation of organic pollutants via carbon quantum dots/TiO<sub>2</sub>. *New Journal of Chemistry*, 45(35), 16168-16178. doi:10.1039/d1nj02387j
- Wei, D., Nurakhmetov, D., Spitas, C., Aniyarov, A., & Zhang, D. (2021). Nonlinear dynamical analysis of some microelectromechanical resonators with internal damping. *Acta Mechanica Sinica/Lixue Xuebao*, doi:10.1007/s10409-021-01114-x
- Yadollahi, E., Chandra, S., Couto, M., Lim, A., & Sandygulova, A. (2021). Children, robots, and virtual agents: Present and future challenges. Paper presented at the Proceedings of Interaction Design and Children, IDC 2021, 682-686. doi:10.1145/3459990.3460516 Retrieved from www.scopus.com
- Yagiz, S., Shaterpour-Mamaghani, A., Yazitova, A., Yermukhanbetov, K., Dogan, E., Erdogan, T., & Copur, H. (2021). Empirical models for estimating performance and operational parameters of raise boring machine in mining applications. Paper presented at the IOP Conference Series: Earth and Environmental Science, , 833(1) doi:10.1088/1755-1315/833/1/012129 Retrieved from www.scopus.com
- Yan, Y., Chen, Y., Wang, Z., Qin, C., Bakenov, Z., & Zhao, Y. (2021). Flower-like Ni<sub>3</sub>S<sub>2</sub> hollow microspheres as superior sulfur hosts for lithium-sulfur batteries. *Microporous and Mesoporous Materials*, 326 doi:10.1016/j.micromeso.2021.111355
- Yan, Y. -, Zhou, W. -, Wang, Y. -, Guo, Q. -, Zhao, F. -, Zhu, Z. -, . . . Zhang, J. -. (2021). The potential role of extracellular vesicles in COVID-19 treatment: Opportunity and challenge. *Frontiers in Molecular Biosciences*, 8 doi:10.3389/fmolb.2021.699929

- Ybrayev, Z. (2021). Distributional consequences of monetary policy in emerging economies: Dollarization, domestic inflation, and income divergence. *Comparative Economic Studies*, doi:10.1057/s41294-021-00163-2
- Yegorov, S., Goremykina, M., Ivanova, R., Good, S. V., Babenko, D., Shevtsov, A., . . . Zhunussov, Y. (2021). Epidemiology, clinical characteristics, and virologic features of COVID-19 patients in kazakhstan: A nation-wide retrospective cohort study. *The Lancet Regional Health - Europe*, 4 doi:10.1016/j.lanepe.2021.100096
- Yermukhanbetov, K., Yazitova, A., & Yagiz, S. (2021). Comparison of strength-based rock brittleness indices with the brittleness index measured via yagiz's approaches. Paper presented at the IOP Conference Series: Earth and Environmental Science, , 833(1) doi:10.1088/1755-1315/833/1/012038 Retrieved from www.scopus.com
- Yezhebay, A., Sengirova, V., Igali, D., Abdallah, Y. O., & Shehab, E. (2021). Digital maturity and readiness model for kazakhstan SMEs. Paper presented at the SIST 2021 - 2021 IEEE International Conference on Smart Information Systems and Technologies, doi:10.1109/SIST50301.2021.9465890 Retrieved from www.scopus.com
- Ysmailov, B. (2021). Interest rates, cash and short-term investments. *Journal of Banking and Finance*, 132 doi:10.1016/j.jbankfin.2021.106225
- Zarghami Dehaghani, M., Yousefi, F., Sajadi, S. M., Tajammal Munir, M., Abida, O., Habibzadeh, S., . . . Saeb, M. R. (2021). Theoretical encapsulation of fluorouracil (5-fu) anti-cancer chemotherapy drug into carbon nanotubes (cnt) and boron nitride nanotubes (bnnt). *Molecules*, 26(16) doi:10.3390/molecules26164920
- Zhagypar, R., Zhagyparova, K., & Akhtar, M. T. (2021). Spatially smoothed TF-root-MUSIC for DOA estimation of coherent and non-stationary sources under noisy conditions. *IEEE Access*, 9, 95754-95766. doi:10.1109/ACCESS.2021.3095345
- Zhang, C., Song, C., He, Z., Zhao, Y., He, Y., & Bakenov, Z. (2021). Rational design of a cobalt sulfide nanoparticle-embedded flexible carbon nanofiber membrane electrocatalyst for advanced lithium-sulfur batteries. *Nanotechnology*, 32(45) doi:10.1088/1361-6528/ac18a2
- Zhang, X., Wang, J., Wang, X., Li, Y., Zhao, Y., Bakenov, Z., & Li, G. (2021). 3D ordered macroporous amorphous Nb2O5 as anode material for high-performance sodium-ion batteries. *Applied Surface Science*, 567 doi:10.1016/j.apsusc.2021.150862
- Zhao, X., Li, Y., Duan, Y., Amin, A., Xie, Y., Shi, C., & Ma, C. (2021). A simple methodology for RNA isolation from bacteria by integration of formamide extraction and chitosan-modified silica purification. *Analytical and Bioanalytical Chemistry*, doi:10.1007/s00216-021-03644-6
- Zhumagambetov, R., Molnár, F., Peshkov, V. A., & Fazli, S. (2021). Transmol: Repurposing a language model for molecular generation. *RSC Advances*, 11(42), 25921-25932. doi:10.1039/d1ra03086h
- Zhuzzhasarova, A., Baesheva, D., Turdalina, B., Seidullaeva, A., Altynbekova, A., Nurgaziev, M., . . . Kushugulova, A. (2021). Epidemiology survey of measles in kazakhstan. *Open Access Macedonian Journal of Medical Sciences*, 9, 704-710. doi:10.3889/oamjms.2021.6542
- Zollanvari, A., & Abibullaev, B. (2021). Bias correction for linear discriminant analysis. *Pattern Recognition Letters*, 151, 41-47. doi:10.1016/j.patrec.2021.07.026