RESEARCH NEWSLETTER

OFFICE OF THE PROVOST - RESEARCH ADMINISTRATION
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IN THIS ISSUE

Global Peer Review Awards 2019

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We would like to congratulate our professors for receiving Global Peer Review Award this year. The Global Peer Review Awards, powered by Publons, are hosted annualy to celebrate reviewers' unwavering commitment to the quality and integrity of scholarly communication. Publons is a global reviewer database. Rankings are calculated by number of verified pre-publication reviews performed and added to Publons between 1 September 2018 and 1 September 2019.

	RESEARCHER	AWARD CATEGORY
	**Abduzhappar Gaipov** Assistant Professor Department of Medicine NUSOM	Clinical Medicine Cross-Field
	**Vasileios Inglezakis** Associate Professor Civil and Environmental Engineering, Chemical and Materials Engineering, SEDS	Enironment and Ecology Cross-Field
	**Timur Atabaev** Assistant Professor Department of Chemistry SSH	Materials Science Cross-Field
	**Enrico Marsili** Associate professor Chemical and Materials Engineering SEDS	Biology and Biochemistry

Young Researchers Alliance

Unite. Share. Explore.

How was YRA created?

Young Researchers Alliance (YRA) was created on April 18th in 2019, by enthusiastic early career researchers working and studying at Nazarbayev University. Common goal that united young professionals from completely different fields was to create an effective platform for interaction between young researchers in Kazakhstan and abroad. Absence of such platform hindered professional solidarity and experience exchange among early career researchers. YRA has expanded from a small team of passionate researchers of Nazarbayev University to an alliance with 198 members from different institutions and cities and keeps growing every day.

What is YRA?

YRA defines itself as a voluntary, self-managed, non-profit association established by the representatives of different research background, who are young and early career researchers, including graduate students and employees active in research.

Vision of YRA is to create a supportive environment for new generations of researchers, scientists, and academics, to support young and early career researchers in aspirations to conduct cutting edge research across disciplines.

YRA members are acknowledged as highly qualified young researchers and some of them have received letters of appreciation from the President of Kazakhstan. Moreover, YRA members also have been selected as members of Council of Young Researchers under the Ministry of Education and Science of RK to represent young researchers' interests in government's policy regarding scientific activity and commercialization of its results.

Events held by YRA

During its short period of existence, YRA has organized number of events in Nur-Sultan and Almaty cities. The first significant event held by YRA was the Networking Reception in December 2018 in Nur-Sultan, where members had an informal evening to meet like-minded people. After receiving a lot of positive feedback from participants of the event it was decided to make this event traditional. Since a large number of early-career researchers are based in Almaty, it was a great idea to organize there next Networking Reception in August 2019.

YRA celebrated its anniversary in May 2019 by organizing The First YRA Forum, where experts from various disciplines gave speeches and demonstrated results of their research activities. Participants of YRA events provided a lot of positive feedback and gratitude for initiative to unite young researchers into one community of like-minded people with a huge passion for scientific research. Furthermore, YRA organizes series of research seminars on various topics that may be interesting to young researchers.

Grants for NU students

Apart from event organization, YRA, supported by Nazarbayev University Social Development Fund, has been able to announce a contest for funding research projects of undergraduate and master students at Nazarbayev University called “Fostering Research and Innovation Potential” program (FRIP). Nine teams and individual projects, accounting for thirteen students, received financial support up to 1 million tenge for implementation of their ideas. Each proposal was blindly reviewed by three independent experts who are highly qualified researchers either with a doctoral degree or on the final stages of their doctoral studies. Currently the third call for proposals for FRIP has been announced.

As was mentioned above, YRA keeps expanding and gathering more and more attention every day and is intended to continue raising professional and social issues of young researchers at government level and beyond, strengthening professional relations between its members, cooperation with professional organizations and associations, and mainly provide various kinds of support to its members.

SHARED BY MAIRA ZHAKSYBAY

How to join YRA:

For more information and registration please visit YRA website

Graduate School of Education News

'Gender and Schooling in Kazakhstan': An Update

Since its inception in February 2019, The 'Gender and Schooling in Kazakhstan' study, funded by NU through the Faculty Competitive Grant (No. 110119FD4522) has made major advances in meeting its objectives. Some of the activities undertaken so far include:

- Training of three doctoral students in undertaking gender research;
- Gender analysis of selected secondary school textbooks in Kazakhstan;
- Policy workshop for stakeholders;
- Knowledge exchange activities;
- Academic dissemination.

Policy Workshop

A policy workshop with stakeholders was organised on 14th June 2019 under the auspices of the First Gender Forum at NU. This half-day workshop sought to better understand some of the issues surrounding gender and schooling in Kazakhstan from the perspectives of stakeholders. Dr Aida Sagintayeva, Dean of the Graduate School of Education (GSE), opened the workshop. Her talk highlighted the significance of the current research for informing policy and practice in textbook development, teacher pedagogy and teacher professional development and school leadership in Kazakhstan. Prof Naureen Durrani shared the project research design, Dr Zumrad Kateva contextualised gender and education in Central Asian and Dr Anna CohenMiller shared emerging findings from the gender analysis of textbooks that the team had undertaken. In a discussion and interactive group setting the participants offered their feedback on the research.

Pic 1: Dr. Aida Sagintayeva
Pic 2: Vice Provost for Academic Affairs Loretta O'Donnell
Pic 3: Workshop participants
Pic 4: Dr Zumrad Kateva, Prof. Anna CohenMiller, and Prof Naureen Durrani

Knowledge Exchange

On the invitation of the Republican Scientific and Practical Center (RSPC) «Textbook» of the Ministry of Education and Science of the Republic of Kazakhstan Prof Naureen Durrani and Dr Zumrad Kataeva shared the findings and implications of the team's textbook analysis with textbook authors, researchers and policymakers on 25 June 2019. The Conference Chair and Director of the RSPC "Textbook" Beybitkul Karimova commented that this analysis will offer a useful base-line for further research on the topic in the context of Kazakhstan. The team will be participating in another knowledge exchange event with staff of RSPC on 18-19 of October. This event is dedicated to the content of education and the development and assessment of quality of textbooks.

Academic Conferences

The analysis of textbooks and literature review has been disseminated at international conferences including:

- 'Doing Gender in textbooks: an analysis of secondary school textbooks in Kazakhstan', ECER (European Conference on Educational Research) Conference - Education in an Era of Risk: the Role of Educational Research for the Future, 3-6 September 2019, Universität Hamburg, Germany.
- The fearful khan and the delightful beauties: Masculinities and femininities in school textbooks in Kazakhstan', 20th CESS (Central Eurasian Studies Society) Conference, Washington, D.C., October 10-13, 2019, George Washington University, USA.
- The construction of gender in secondary school textbooks in Kazakhstan: What role for the teacher? XI NIS International Research-to-Practice Conference, 24-25 October 2019, Nazarbayev University.

Upcoming activities

- **Qualitative Case Studies:** Dr Anna CohenMiller and Zhadyra Makhmetova have kick-started data collection for Qualitative Case Studies of Schools in Nur-Sultan. This will be followed by data collection in the South region by Dr Zumrad Kataeva and Prof Naureen Durrani and in the Northern Region by Dr Zumrad Kataeva, with the support of a research assistant.
- **Quantitative Phase:** Next year the team is constructing questionnaires for students, teachers and school leaders informed by the analysis of qualitative data to be administered in different regions of Kazakhstan, following a pilot study.

THE ARTICLE IS SHARED BY DR. NAUREEN DURRANI

School of Sciences and Humanities News

NU Students Help Pre-Test New Survey on Punishment

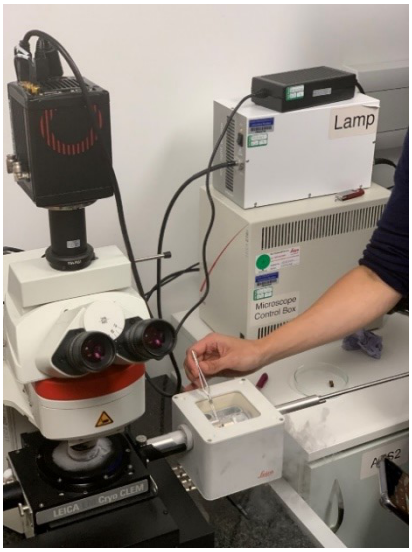
On September 9th, NU student volunteers participated in a research workshop that also served as a pre-test for a new survey instrument on attitudes to punishment in former Soviet countries. The workshop took place as part of the UK-funded project 'In the Gulag's Shadow: Producing, Consuming and Perceiving Prisons in the Former Soviet Union.' The project is a collaboration between the University of Strathclyde (UK), the Higher School of Economics (Russia) and NU. One strand of the three-year study is to conduct a survey to measure punitiveness in Russia and Kazakhstan – that is, how much punishment people want, what form the punishment should take and support for specific penal policies. The survey also gauges views on the Soviet Gulag. Professors Alexei Trochev, Gavin Slade (NU) and survey-expert Daniel Horn (visiting NU from Strathclyde) organised the workshop. NU students were the first people to try out the survey instrument. Dividing into pairs, students practised survey interviewing and being survey respondents using Kobo, an online programme for survey administration. Working through the instrument the students provided vital diagnostics on the survey length, problems of question wording, question order, conceptual and translation confusions as well as ensuring inclusive language. The survey instrument will be further pretested and piloted before being rolled out to the general population in Kazakhstan and Russia. Thank you to our NU students for their time and help from the In the Gulag's Shadow team!

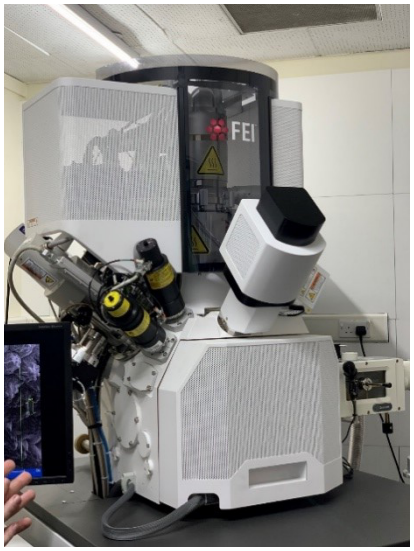
PREPARED BY DR. GAVIN SLADE

NU Student Participated in EM Summer School Organized by Royal Microscopical Society

The Electron Microscopy Summer School in the University of Leeds, UK, is an annual event organized by Royal Microcopical Society. It is a 5-day intensive course, which aims to provide a basic training in both the theory and practice of scanning and transmission electron microscopy for people from around the world. This year, a Graduate student from NU SSH Department of Biology, Bakyt Sadvakassova, participated in this event.

Bakyt is working with Dr. Natalie Barteneva, studying diatoms of Kazakhstan lakes, so her thesis is going to be heavily related on SEM imaging and participation in this course was a great opportunity to get first-hand experience from the imaging experts. The course started with intensive theoretical explanation of basic electron microscopy principles and then all the participants were separated into three main groups: Biological SEM/TEM, Physical, TEM and Physical SEM. Each day there were two or three sessions going simultaneously and participants were able to choose any training of their interest. Basic EM trainings contained sample preparation, chemical fixation of biological samples, and protein localization in cells as well as crystallography and electron diffraction for material sciences, sample coating and working with microtome, alignments of both SEM and TEM. In addition to all the basic sessions, they provided trainings on more advanced EM techniques such as using focused ion beam (FIB) in SEM, correlative light and electron microscopy (CLEM), advanced EDS analysis for both SEM and TEM, Cryo-SEM and Cryo-TEM, and more.





The University of Leeds has inside its buildings almost any possible type of EM, with all of the additional equipment installed, so every participant had a chance to work with the machine similar to the ones they had at their universities. Organizers of the workshop did a great job in explaining basics as well as sharing some tips and tricks when working with different types of samples on different magnifications and still obtaining the best possible images.

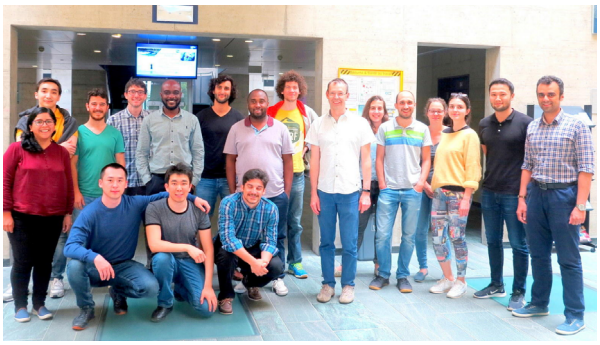
SHARED BY BAKYT SADVAKASSOVA &
DR. NATALIE BARTENEVA

School of Mining and Geosciences

Winning scholarship for PhD program in University of Adelaide by Yerniyaz Abildin

We are happy to announce that the recently graduated student of mining engineering, Yerniyaz Abildin won the full scholarship from University of Adelaide for PhD study in mining engineering. Yerniaz did his master thesis on Geostatistics under supervision of Dr. Madani and is going to pursue his research on the same topic with Prof. Peter Dowd during this PhD program. Prof. Dowd is among top-five great geostatistician in the world. Yerniyaz, during his master study, published a prestigious paper in peer-reviewed journal «Minerals» and presented two papers in two world-class mining conferences. We wish the best of luck for all of our alumni in all of their future endeavors. Congratulations on this great achievement to him and SMG family.

Joint workshop between Nazarbayev University and University of Neuchâtel in Switzerland



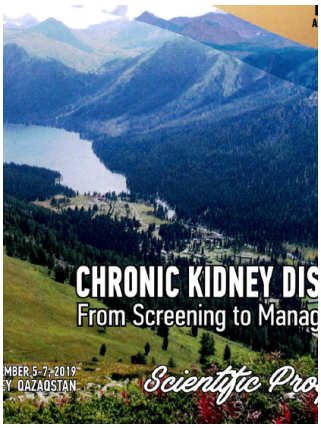
Joint workshop between Nazarbayev University and University of Neuchâtel has been successfully accomplished during June 17th-20th, 2019 in Neuchâtel, Switzerland. In this workshop, two important geostatistical approaches of facies modeling (plurigaussian simulation and multiple-point statistics) were discussed by Dr. Nasser Madani, Prof. Philippe Renard and Dr. Julien Straubhaar and hands-on practical case studies implemented by corresponding software for each methodology. Professionals and students attended in this 4-day workshop from different countries such as Kazakhstan, Switzerland, France, South Africa and Malaysia. These two geostatistical techniques can be applied to model geological heterogeneity and in particular the spatial distribution of categorical variables such as rock types or lithofacies. The attendance of Kazakhstani graduates and students in this workshop was fully funded by Swiss Government through an international joint research project between Dr. Madani and Prof. Renard which was started on July 2018.

PREPARED BY PROF. NASSER MADANI

SHARED BY DR. MATTHEW NAANLEP TANKO

NUSOM professor presents his paper at the National Congress

Dr. Matthew Naanlep Tanko, an Associate Professor of Practice in the Department of Biomedical Science, NUSOM presented his conference paper at the **3rd National Congress of the Association of the Society of Nephrologists, Dialysis and Transplant Physicians conjoined with the 7th International Kazakh-Turkish Nephrology Congress** in Semey, Republic of Kazakhstan in September 5-7, 2019.



The purpose of the given congress was to discuss critical issues of nephrology and application of innovative technologies to resolve them on the regional level of the country.
In his report titled «Highlights of Morphologic Features Predicting Renal Outcomes in Lupus Nephritis», Prof. Tanko states:

''The current International Society of Nephrologists and Renal Pathology Society classification (ISN/RPS) of lupus nephritis was an improvement on the Who Health Organization and National Institutes of Health classification schemes. These former schemes were primarily glomerulocentric (focused only on glomerular lesions). In the ISN/RPS scheme, vascular and tubulointerstitial lesions were added to the diagnostic line. This new classification scheme demonstrated a high level of standardization and reproducibility of diagnosis. However, its predictive value (prognostication) in terms of renal survival, renal flare or progress to end stage renal disease after various forms of therapy including induction immunosuppressive therapy remains low and even shown to be controversial in many studies. Experts in Nephrology and Renal Pathology around the world have conducted many studies to highlight evidence-based morphologic parameters that can be used to predict renal survival, renal disease flare or progress to end stage renal disease in patients with systemic lupus erythematosus (SLE). The results of these studies suggest that a new classification scheme for lupus nephritis is required. A similar scheme to that of the Oxford classification of IgA nephropathy and the modified National Institutes of Health (NIH) scoring system will be the way forward in lupus nephritis. Modifications in the morphologic threshold definitions and terminologies have been suggested in the proposed new scheme. In most of the studies, fibrinoid necrosis, fibrous crescents, interstitial fibrosis, tubular atrophy and thrombotic microangiopathy have shown strong agreement as independent morphologic predictors of renal survival, renal flare or end stage renal disease. They demonstrate the activity and chronicity indices of the renal lesions. The value of repeat biopsies has also been stressed in these studies. While we await the validation of a new scheme, pathologists reporting on renal biopsies (both initial and repeat) from patients with lupus nephritis should use the modified NIH scoring system in their diagnosis of renal lesions in patients with lupus nephritis.''

ISN/RPS classes in relation to outcome

Renal flare and ESRD

ISN/RPS classes were not significantly associated with overall renal survival (Log Rank test, *P*=0.7) and renal flare (Log Rank test, *P*=0.3) by Kaplan-Meier analysis (Figures below).

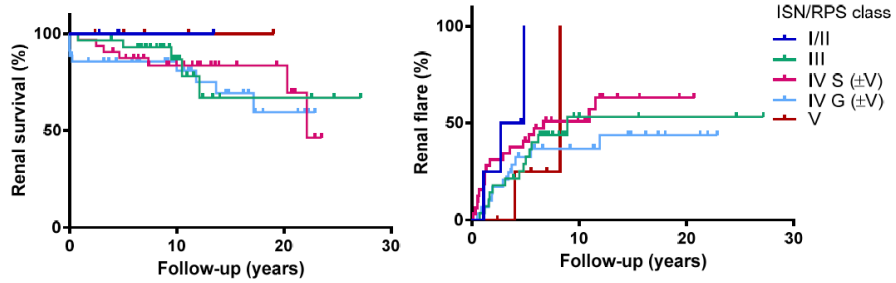


Figure 1: Comparison of ISN/RPS classes in relation to renal outcome in lupus nephritis

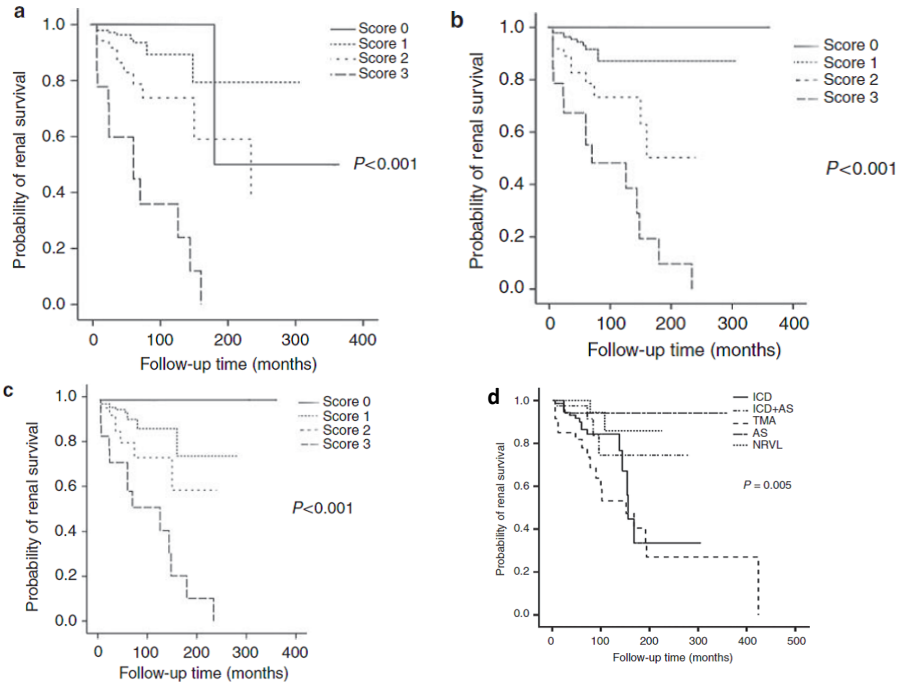


Figure 2: Comparison of renal outcome between patients with different scores (NIH scores) of tubulointerstitial and vascular indices in lupus nephritis. a) interstitial inflammation, b) tubular atrophy, c) interstitial fibrosis, d) vascular lesions. ICD: immune complex deposit, ICD+AS: immune complex deposits plus atherosclerosis, TMA: thrombotic microangiopathy, AS: atherosclerosis, NVRL: no vascular renal lesion

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Dr. Aljofan published a systematic review on the anticancer activity of Metformin in Future Science OA together with Dr. Riethmacher

Prof. Mohamad Aljofan

Dr. Dieter Riethmacher

Dr. Dr. Aljofan and Dr. Riethmacher have recently published an article titled *''Anticancer activity of metformin: a systematic review of the literature''* in Future Science OA.

The anticancer activity of metformin has been confirmed against several cancer types in vitro and in vivo. However, the underlying mechanisms of metformin in the treatment of cancer are not fully understood. Therefore, this systematic review of the literature is focussing on deciphering the underlying mechanisms for this anticancer activity. Interestingly AMP-activated protein kinase (AMPK) known to be essential for cellular energy homeostasis was identified several times as being affected by metformin. It appears that metformin can directly act on cancer cells by targeting the AMPK pathway or alternatively by inhibiting cancer growth and proliferation via reducing insulinemia and glycemia. This review highlights the importance of AMPK as a potential target for anticancer therapies and possibly to reevaluate metformin usage as an anticancer adjuvants.

PREPARED BY DR. DIETER RIETHMACHER

Environmental Science & Technology Group

PREPARED BY ESTG GROUP

Congratulations for being appointed as Associate Editor

We are pleased to inform you that Prof. Vasileios Inglezakis is invited as Associate Editor of the International Journal of Recycling of Organic Waste in Agriculture.
"*We are approaching you because, given your expertise, our Editors would very much like your assistance on our journal*", written in the invitation letter. We congratulate you on these undertakings!

For reference:
The International Journal of Recycling of Organic Waste in Agriculture is a single-blind peer-reviewed open access journal published under the brand SpringerOpen, covering all aspects of recycling of organic waste. It is fully supported by the Islamic Azad University, who provide funds to cover all costs of publication, including the Article Processing Charges (APC's) for all authors. Therefore the journal is both free to read and free to publish in.

Research visit to Edinburgh

Gaukhar Ulykbanova, a member of ESTg group, was invited for a research visit to the School of Engineering at the University of Edinburgh during June 2019. She is working with Dr Efthalia Chatzisymeon and her colleagues in the School of Engineering and the School of Chemistry, on photocatalytic treatment of emerging pollutants (Bisphenol A and 4-tert butylphenol) under UV and visible light irradiation as kickstart collaboration between Nazarbayev University and University of Edinburgh. This work will be a continuation of her research with Dr. Stavros Poulopoulos, Associate Professor at the Department of Chemical and Materials Engineering at Nazarbayev University. This visit will be part of the new network for research on the energy-water nexus in Central Asia which is currently being set up at the University of Edinburgh.
The University of Edinburgh is ranked 18th in the world by the 2019 QS World University Rankings. It is ranked as 7th best in Europe by the 2019 Times Higher Education Ranking, and 4th in the UK for research power, based on the 2014 Research Excellence Framework by Times Higher Education.

Productive summer at Alicante #ESTglife #membersachievement

Our ESTg members, Almira Yagofarova and Aknur Baibatyrova, have participated in a traineeship in the framework of Horizon-2020 Nanoporous and Nanostructured Materials for Medical Applications (NanoMed) project at Inorganic Chemistry Department of Universidad de Alicante, Spain.

They were working under the supervision of Prof. Vasileios Inglezakis (NU) and Prof. Joaquin Silvestre-Albero (University of Alicante). They have characterized the adsorption properties and adsorption capacity of various types of modified zeolites. The kinetics of the removal of iodide and mercury ions from water solutions were observed by measuring concentration of ions. Also, the materials adsorption efficiency of selected samples were determined by X-ray diffraction (XRD) and X-ray Photoelectron Spectroscopy (XPS) analysis.

Research secondment in Budapest University of Technology and Economics

Dr. Zhandos Tauanov, a member of the ESTg group, is currently having a 1-month research secondment in Budapest University of Technology and Economics, Budapest, Hungary (28 June/27 July). The research is fully supported under the framework of Horizon-2020 RISE international project entitled “Novel Nanoporous Materials for Biomedical Applications” (acronym “NanoMED”).

He is performing research under the supervision of Prof. Vasileios Inglezakis (NU) and Prof. Krisztina Laszlo (host). The current work is related to preliminary investigation of novel carbon-based aerogels for sorption capacity of phosphorous pollutant from water.

On the picture Dr. Tauanov performing the UV-Vis analysis of phosphorous using colour development approach under different experimental conditions. #ESTglife #ESTgpeople

ESTg hosted a delegation from Kingston University (UK) on 19th and 20th of August

The purpose of the visit was to strengthen the bonds between the research groups and identify possible areas of collaboration. Joe Bear (Lecturer in Inorganic Chemistry), Rosa Busquets (lecturer in Analytical and Forensic Chemistry) and Patric Melia (postdoc working on synthetic sorbents for the removal of heavy metals and organic pollutants from water) delivered presentations on their research and had a lab tour organized by ESTg team.

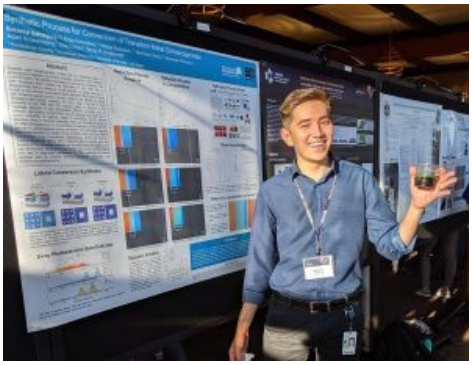
Erasmus Program in action

Prof. Mait Kriipsalu and Prof. Kaja Orupold visited Nazarbayev University from 2nd to 6th of September. They participated in teaching activities involving the third and fourth-year B.Sc. students of Civil & Environmental Engineering department as well as in site visit to the city landfill and waste mechanical treatment facility. The visit was in the framework of the European project: Erasmus+ Program International credit mobility Key Action 1: Learning Mobility of Individuals, lead by V. Inglezakis (PI) in collaboration with the Estonian University of Life Sciences (2018-2019).

Training on the synthesis of nanoparticles by Prof.Capobianchi

ESTg group is hosting an experienced scientist Dr. Aldo Capobianchi, CNR, (Italy, Rome) from 2-18 September 2019, who is an expert in the field of nanoparticles and composites design, synthesis and characterization. Dr. Aldo is training a group of research assistants and graduate students of Nazarbayev University on the synthesis of silver nanoparticles, magnetite nanoparticles, magnetite, and graphene oxide nanocomposites with silver nanoparticles that could be applied in adsorption of organic and inorganic pollutants from water.

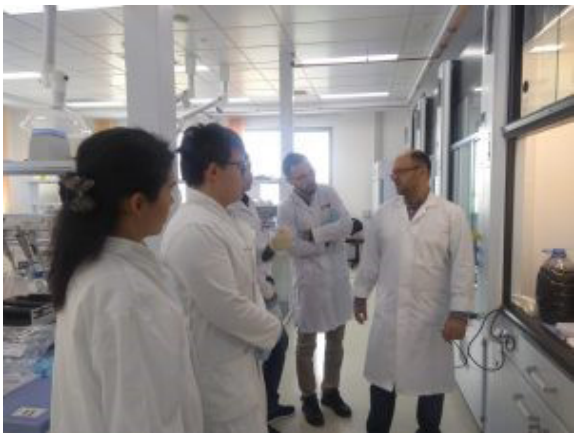
Student internships at one of the world's best labs!



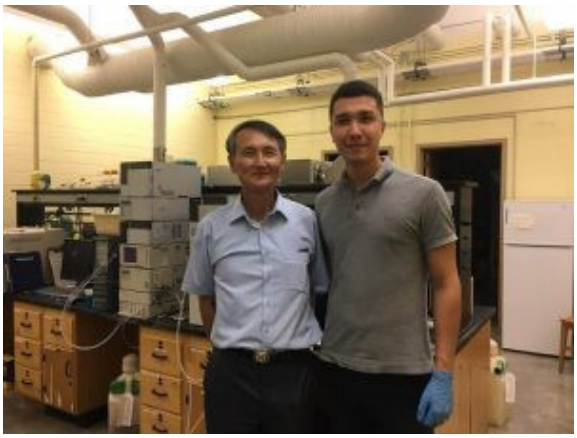
This summer Bekassyl Battalgazy, a member of ESTg, participated in a 3-month internship at The Molecular Foundry, Lawrence Berkeley National Lab. He worked on the project which of fabricating and developing synthetic process for conversion of transition metal dichalcogenides. Transition metal dichalcogenides (TMDs) are an interesting class of semiconductor materials due to their emergent properties when reduced to thin 2D layers. Moreover, after completion of his internship he presented research outputs at the 2019 Annual Nanoscience Conference at Berkeley Lab. In this project ESTg collaborated with Prof. Tikhonov from the School of Sciences and Humanities.

Guest lectures and training by the National Technical University of Athens

Prof. Simos Malamis from the National Technical University of Athens (Greece) delivered a series of lectures and lab sessions over the period of 16-20 September on the biological treatment of wastewater (activated sludge systems). Members of ESTg participated in the training which was organised within the framework of ORAU project "Development of a Novel Technology for Production of High-Quality Reclaimed Water: Track Etch Membrane Bioreactor" led by Prof. Arkhangelsky (PI) and Prof. Inglezakis (Co-PI).



ESTG alumni



We are proud and very happy for our member Bexultan Abylkhani who started the graduate degree semester at one of the top universities in the world UW-Madison College of Engineering.
In the photo Bexultan with Professor Jim Pak, ESTg's collaborator from the University of Wisconsin-Madison.

Department of Chemical and Materials Engineering faculty member works on heart decellularization to be used as a bioartificial heart

Cevat Erisken, PhD

Despite remarkable advances in the past decades, heart-related defects are still prone to progress irreversibly, and can eventually lead to heart failure. A personalized extracellular matrix (ECM) based bioartificial heart created by allografts/xenografts emerges as an alternative as it can retain the original 3D architecture combined with a preserved natural heart ECM. The study aims at developing a procedure for decellularizing heart tissue harvested from rats and evaluating decellularization efficiency in terms of residual nuclear content and structural properties.

Rats (7-week-old, female Wistar rats) were euthanized and the thorax was opened by a median sternotomy. The hearts were, then, removed from the chest and a blunt needle was inserted into the ascending aorta and sutured to allow for retrograde coronary perfusion (Figure 1).

Figure 1. Harvesting the heart from mouse and perfusing the nuclear material

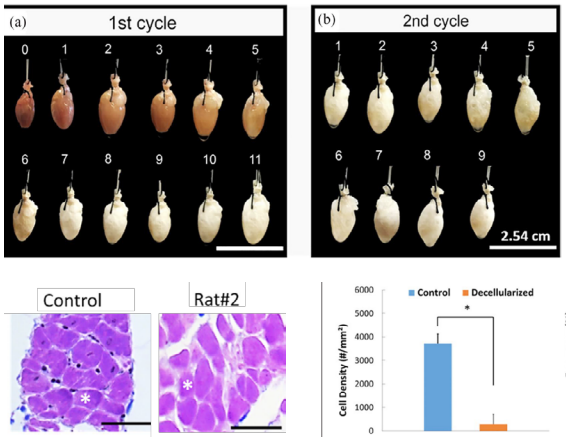


Figure 2. Qualitative and quantitative examination of decellularized mouse heart. Scale bar in bottom left: 25μm.

Upon perfusion, tissue sections showed no or little visible cell nuclei in decellularized heart, whereas the native heart showed dense cellularity (Figure 2). In addition, there was no significant variation in the alignment of muscle fibers after decellularization. Furthermore, no significant difference was detected between native and decellularized heart in terms of muscle fiber diameter. The bioartificial scaffold generated here can be functionalized with patient's own material, and utilized in regenerative engineering. To further this study, Dr. Cevat Erisken and his team now focus on performing a similar approach on large animals, i.e., pigs, and testing the decellularized heart in vivo.

WRITTEN BY PROF. CEVAT ERISKEN

NU students share their research findings:

Social Link Prediction based on Partial Temporal Network Evolution

Rapid development of modern social networks has facilitated interactions between millions of users. Considered as the main source of information spreading, most efforts tackling the problem of link prediction and information diffusion rely hugely on empirical and statistical data. In complex networks, link prediction is an important task, which can be used to evaluate dynamics and interactions in the network. Link prediction algorithms can be applied to identify future interactions between nodes, creation of new communities, and network evolution. Therefore, modelling of information diffusion as well as any spreading phenomenon is extremely challenging. While researchers typically rely on static mathematical models, temporal evolution of the networks have yet to be scrutinized.

Typically, works in link prediction are based on extracting network features, such as node degree distribution, number of connected components, probability of network growing and collapsing, transitivity, clustering coefficients from temporal network Figure 1. Temporal network is defined as a list of network states in different timestamps.

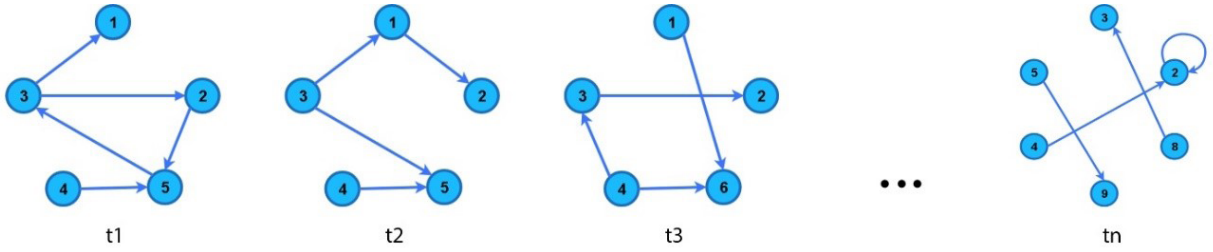


Figure 1. Temporal network at different timestamps

In this case, it can be presented as time series data, where model makes prediction on link states based on features from previous timestamps. In this work, we propose a new model to predict the interactions between nodes of the network in long-term, which is based on analysis of the network topology directly. The model predicts the state of the links by analyzing the partial information of the network edges without extracting any specific features which reduces the computational time of the model.

At the Complex Networks and Systems Laboratory (CNSL), we apply machine learning models with L1 regularization, which performs dimensionality reduction. It means that out of all edges in the network, the model finds those edges, the state of which affects the state of the link we want to predict as shown in Figure 2. In order to optimize the loss function of machine learning models, Stochastic Gradient Descend (SGD) was used. It relates to the fact that network consists of 45,000 edges and 600 timestamps. Conventional Gradient Descend in general considers all training samples at one iteration, which means computing 45,000 derivatives over all 600 training samples. SGD on the other hand uses one sample at a time which reduces computation time in more than 600 times. The findings of this research are being drafted for submission to Nature Scientific Report.

Average test accuracy	0.81
F1 score	0.68
Precision	0.65
Recall	0.73
AUC	0.79

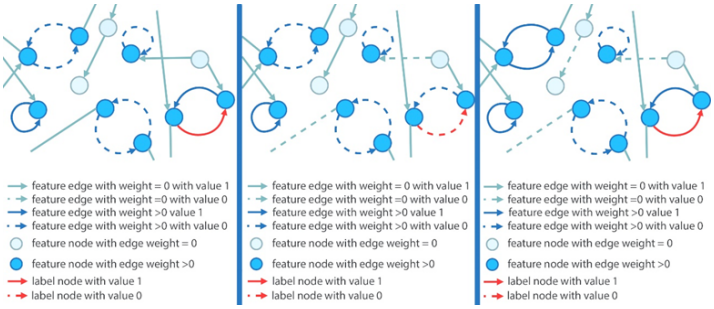
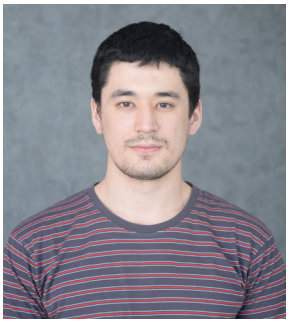


Figure 2. Sample of a social network evolving at different timestamps

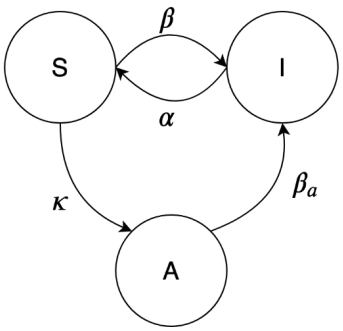


WRITTEN BY RASUL KAIRGELDIN

Inferring Dynamics of Signed Networks Coupled with Epidemic Spreading

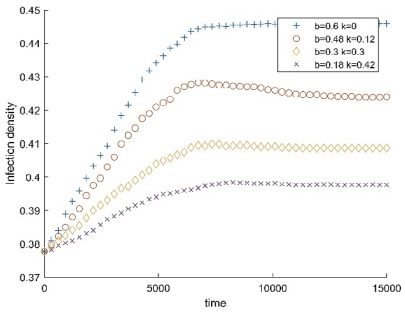
AUTHORED BY TEMIRLAN KALIMZHANOV

Living in a period of digital technology, it is getting harder by the day to find a person who is not registered on social networks or instant messengers. This is not surprising as social networks are built to virtually engage social users in various kinds of communities: publications, news, entertainment, and communication. These networks have become the main source of information for most Internet users. As a result, we have that in the most popular social network there are now **more than two billion active users**. Tracking of the data flow in social networks however, is non-trivial. Spreading of rumors, opinions, and other information can profoundly influence and shape the attitude of the crowd towards a person or an object. To simulate such complex networks, we use concepts from **epidemic modeling**, where information takes the role of infection.

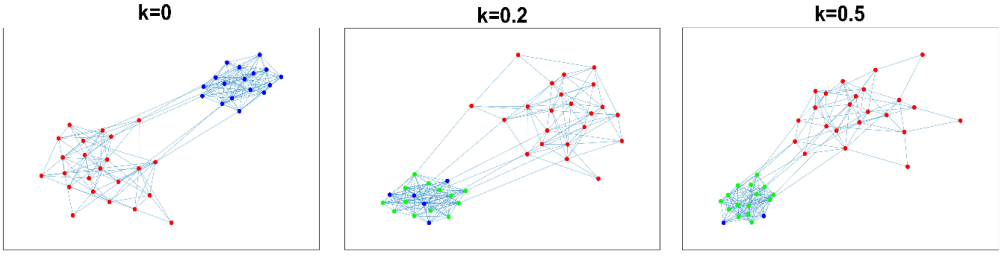


Most existing works on information diffusion are based on epidemiological distribution model in which two agents are fundamentally involved: Susceptible (S) and Infected (I). Infection occurs from the Infected node towards Susceptible with defined rate if they are connected. In the 'SIS' (susceptible-infected-susceptible) model, the infected node can be cured and returned to its original healthy state. While these analysis reveal interesting charcteristics of the network, they canot be applied to **signed social networks**, where edge polarity between nodes exist. That is to say, in a signed network, each edge has a positive and negative sign equal to "friendly" and "unfriendly" state that changes over time.

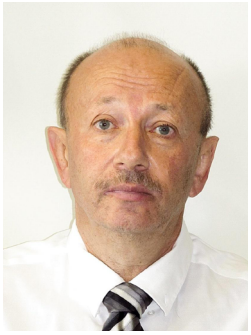
We consider '**SAIS**' model over the signed network to analyze epidemic spreading. 'SAIS' model has extra 'Alerted' state over traditional 'SIS'. The introduction of this condition simulates the real behavior of an agent who can be informed about the disease and will try to alleviate the risks. We consider our network as a set of triangles between all participants, so we can evaluate the "balance energy" of the network. The whole system strives for a balanced structure, and according to **Heider's theory of balance**: "the friend of my friend is also my friend", and "the enemy of my enemy is my friend" are the balanced triangles. In addition to this theory, we derived an equation for the spreading energy of the infection.



We learn that disease infection only occurs **on a friendly edge**. We examine how 'Alerted' state change the final balance state with new energy function. We define a new network structural balance over the new relation energy model and the Heider's energy model. The model has been studied for varying 'Alerting' and 'Infecting' rates and different initial 'Infected' density and 'friendly' edges ratios. Results obtained through extensive simulations show that **with an increasing 'Alerting' coefficient, the number of infected people decreases**, as well as separate clusters of healthy and infected ones are formed in the steady-state.



NU Power Electronics Research Lab (PERL) News - Summer 2019



Prof. Alexander Ruderman

Prof. Alexander Ruderman attended International Conference on Power Electronics ICPE-ECCE in Busan, Korea, to chair the session on «Controls of Grid-Connected Inverter» and present a paper titled as «Natural Balancing Modulation Strategy for a Hybrid H-Bridge Five-Level Neutral Point Clamped Converter with Capacitor Cells» co-authored with NU alumni Nursultan Ornov and prepared in collaboration with colleagues from Silesian University of Technology, Gliwice, Poland. Nursultan Ornov is the first (2015) NU cohort graduate and PERL alumnus that obtained his MSc degree from Aachen University, Germany, in 2017 (currently works for Daimler-Siemens Automotive).

Invited by colleagues from Seoul Universities, Prof. Ruderman used this opportunity to give four guest lectures about his research on time domain methods applied to multilevel power converters:

- Hanyang University, Prof. Rae-Young Kim;
- Konkuk University, Prof. Younghoon Cho;
- Seoul National University (SNU), Prof. Seung-Ki Sul, IEEE Fellow;
- Seoul National University of Science and Technology (SeoulTech), Prof. Sewan Choi, IEEE Fellow.

Student summer internships

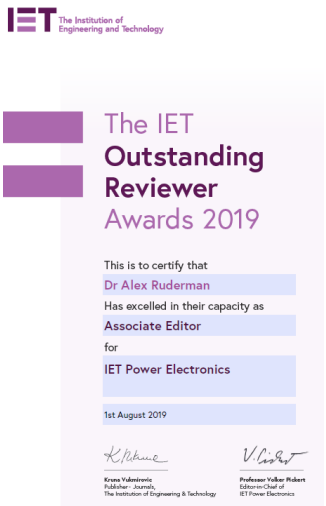
The 3rd year (at that time) undergraduate students made there 2019 summer internships abroad:

1. Aldiyar Semedyarov - University of Buffalo (Profs. Xiu Yao and Luis Herrera Lab);
2. Zhansen Akhmetov - Zhejiang University, National Specialty Laboratory for Power Electronics (Director Prof. Xiangning He, IEEE Fellow);
3. Yerzhan Mustafa - the University of Buffalo (Profs. Xiu Yao and Luis Herrera Lab) and Gdansk Technical University, Poland (Prof. M. Makowski).

NU/PERL 2017 alumnus Aidar Zhetessov returned to Nur-Sultan after successfully completing his 2-year MSc studies at prestigious ETH Zurich

In 2016, Aidar made his summer internship in the same university sponsored by Yessenov Foundation. In the QS World University Rankings 2020 edition, ETH Zurich is ranked 6th in the world and 2nd in Europe (after the University of Oxford). It is Alma Mater for 32 Nobel laureates (including Albert Einstein), 4 Fields Medalists, and 1 Turing Award winner.

The IET Outstanding Reviewer Awards 2019



The Senior Board of IET Power Electronics Journal has recognized Prof. Ruderman for his services to the journal and review process. He also was invited by Prof. Fei Wang of Shanghai University to give a guest lecture about his research on multilevel converters pulse width modulation.

SHARED BY PROF. ALEXANDER RUDERMAN

J. Yap attends Global MIL Week Feature Conference in Gothenburg

The Global MIL Week Feature Conference which happened in Gothenburg, Sweden from 24-26 September 2019 brings together media practitioners, information professionals, government and non-government organizations to discuss the worldwide status of MIL both in practice and research. With the proliferation of misinformation and disinformation, it is necessary for all citizens to be aware on dealing with the broad spectrum of data and information around us. Joseph Yap, Expert-Manager from the Reference Department of the Library discussed his research paper entitled, "*The Amazing Library Race: Developing the Students MIL Skills through Games: the Case of the Philippines and Kazakhstan.*" The paper was written in collaboration with Janice Penaflor from De La Salle University Library. The objectives of the paper is to share the practices of two academic libraries in developing a game-based strategy to attract and engage users and teach them how to solve information-related problems. They discussed the steps made in order for them to come-up with a gamified Information Literacy.

The conference attracted participants from around the world spanning different continents of Australia, Africa, Asia, North and South America, and Europe. The opening ceremony was attended by the Minister of Education of Sweden, Ms Anna Ekstrom who is passionate about freedom of expression and information. The keynote speaker was Professor Ulla Carlsson, who was given a special award by UNESCO Sweden for her professional dedication which is visible in her work. Various parallel sessions were available for the participants. From sustainable development goals and peace, lifelong learning and trust, elections and good governance, freedom of expression, dialogue and engagement, gender equality and social inclusion and many others. Alongside the conference is the Gothenburg Book Fair which is the second largest book fair in Europe.

The feature events agenda can be accessed here. The Global MIL Week 2019 will be celebrated from 24 to 31 October. Nazarbayev Univesrity Library will be hosting the MIL Day on October 25. You can view the event here.
The next conference will be held in South Korea.

WRITTEN BY JOSEPH YAP

NU User Experience Study at NEICON Conference in Greece

NU Librarians attended the 7th NEICON International Conference *«Electronic Resources for Research and Education: Development, Promotion and Use»*. The Conference was held on September 22-29 in Greece by National Electronic-information Consortium (NEICON). Librarians, scientific and academic publishers, information providers presented and discussed the emerged issues of scholarly and scientific communication, future development of open access, the value of bibliometric indicators for research and science, DOI and online journals publishing, libraries resources for academic programs, publishers and libraries response to state educational policies, effectiveness of e-resources stakeholders collaboration. Participants also had a chance to attend the on-cite workshops provided by Wiley and Clarivate Analytics.

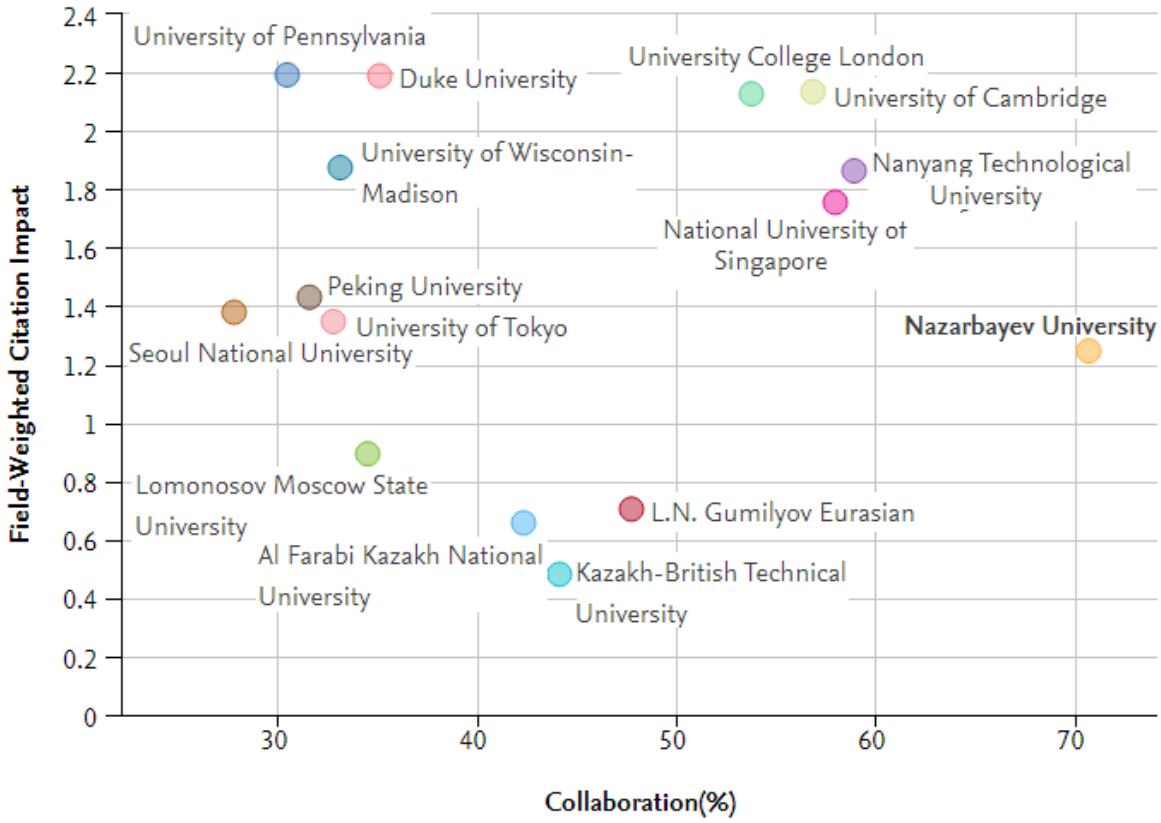
Darya Zvonareva, Expert-manager of Reference Department and Subject Librarian for SEDS, shared research results presenting on the topic of «User experience matters: towards improving the discovery service at the academic library»: «The purpose of the study was to improve the information discovery and retrieval experience of the users. With this engagement, we tried to evaluate how patrons use the tool and satisfied with this search engine for their research needs».

The program and materials can be found on the conference website.

The slides from the presentation will also be available in the NU Repository.

PREPARED BY DARYA ZVONAREVA

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 3,058 peer-reviewed publications indexed by Scopus, and have been cited 14,299 times for 2011-2019 period (Source: Scopus, October 2). The approximate number of citations per peer-reviewed publication is 4.68. The overall H-index of NU is 38, whereas H5-index is 28. The field-weighted citation impact is 1.25, meaning that our publications have been cited 25% more than would be expected based on the world average for similar publications.

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

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

Funding Institutional

Gain a competitive edge
with funding insights, discovery & decisions

Dear NU Community,

We would like to remind you that we have a subscription for Funding Institutional software that anyone affiliated with Nazarbayev University can use to search for external grants from government and private funding organizations.

Funding Institutional - is a search tool for funding opportunities, awarded grants and funder profiles.
You can search grants by:

- **Your research discipline**
- **Grant type** (research, travel grant, training etc.)
- **Eligibility requirements:**
  experienced researchers
  young professionals
  grad and undergrad students

HOW TO USE?

- Anyone with our corporate email (@nu.edu.kz) has an opportunity to use Funding Institutional.
- Just go to https://www.fundinginstitutional.com
- The user interface of FI is pretty intuitive. If you get stuck at some point, refer to the user manual that is available via this link.

NOTE: If you are **outside the campus**, follow these steps to access the system:

1. Go to electronic resources page
2. Click on **Funding institutional**
3. Enter your login and password (a.k.a. your name.surname and password you use to log in to your computer or directum or my.nu.edu.kz)
4. Enter your Funding institutional login and password (a.k.a. your e-mail and password you have registered with on Scopus/SciVal/Funding Institutional)

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

FUNDING OPPORTUNITIES

#	Opportunity	Funder	Amount	Deadline	Source link
1	Research opportunity in parasitology for food safety	Oak Ridge Associated Universities	Not specified	2019-10-05	URL
2	Patient and Public Involvement (PPI) grants	Queen Mary University of London	Up to 500 GBP	2019-10-15	URL
3	Community engagement grants	Queen Mary University of London	Up to 500 GBP	2019-10-15	URL
4	Public engagement small grants	Queen Mary University of London	Up to 1,000 GBP with total funding of 2,000 GBP	2019-10-15	URL
5	Biodefense research opportunity in infection and vaccination of foreign animal diseases	Oak Ridge Associated Universities	Not specified	2019-10-23	URL
6	Biodefense research opportunity in infection and vaccination of foreign animal diseases	Oak Ridge Associated Universities	Not specified	2019-10-23	URL
7	Postdoctoral research program	Earth Institute, Columbia University	Not specified	2019-10-30	URL
8	Postdoctoral research opportunity in soybean diseases and pests	Oak Ridge Associated Universities	Not specified	2019-11-01	URL
9	Instructional Development Fund: Diversity/International projects	Ithaca College	Up to 3,000 USD	2019-11-15	URL
10	Instructional Development Fund: Direct course enhancement	Ithaca College	Up to 1,500 USD	2019-11-15	URL
11	SME Leaders programme	Royal Academy of Engineering	Up to 10,000 GBP	2019-11-18	URL
12	LEADER Grants	University of Saskatchewan	Not specified	2019-11-30	URL
13	International dissertation research grants	American Academy of Religion	Up to 5,000 USD	2019-12-01	URL
14	FDA Bacteriophage therapy: Staphylococcus aureus	Oak Ridge Associated Universities	Not specified	2019-12-31	URL
15	PhD Program	Center for the History of Print and Digital Culture, University of Wisconsin	Not specified	2019-12-31	URL
16	Steven H. Sandell grant program	Center for Retirement Research, Boston College	Up to 45,000 USD	2020-01-31	URL
17	Dissertation completion grant	Charles Warren Center for Studies in American History, Harvard University	Not specified	2020-02-08	URL
18	Term time research grant	Charles Warren Center for Studies in American History, Harvard University	Not specified	2020-02-08	URL
19	Kuyers international programs fund	H. Henry Meeter Center for Calvin Studies, Calvin College	Not specified	2020-02-17	URL
21	ETH4D Research challenges	Eidgenössische Technische Hochschule Zürich	Up to 200,000 CHF	2020-02-28	URL

FUNDING OPPORTUNITIES

#	Opportunity	Funder	Amount	Deadline	Source link
22	Innovations Deserving Exploratory Analysis (IDEA) - NCHRP Highway IDEA	Transportation Research Board	Not specified	2020-03-01	URL
23	Internal Research/Creative Project Grant (IRCPG)	University of Victoria	Not specified	2020-03-01	URL
24	Major program	Zhejiang University	Not specified	2020-03-20	URL
25	Major research plan	Zhejiang University	Not specified	2020-03-20	URL
26	National science fund for distinguished young scholars (International)	Zhejiang University	Not specified	2020-03-21	URL
27	Gupta research grant	University of Winnipeg	Up to 6,000 USD	2020-04-30	URL
28	Innovations Deserving Exploratory Analysis - Transit IDEA	Transportation Research Board	Not specified	2020-05-01	URL
29	EACVI Research grants	European Association of Cardiovascular Imaging	Up to 25,000 EUR	2020-09-30	URL
30	Ritchie trust research award	Royal College of Physicians and Surgeons of Glasgow	Up to 30,000 GBP	2020-11-30	URL
31	General program in Humanity and Social Sciences: Special program	Zhejiang University	Not specified		URL
32	General program in Humanity and Social Sciences: Young scientist program	Zhejiang University	Up to 80,000 CNY		URL
33	General program in Humanity and Social Sciences: Planned fund program	Zhejiang University	Up to 100,000 CNY		URL
34	Computational Science and Technology Advanced Research Studies (C-STARS) - Modeling and simulation	Oak Ridge Associated Universities	Not specified		URL
35	Computational Science and Technology Advanced Research Studies (C-STARS) - Artificial intelligence	Oak Ridge Associated Universities	Not specified		URL
36	Transit Cooperative Research Program	Transportation Research Board	Not specified		URL
37	Research opportunity in molecular biology	Oak Ridge Associated Universities	Not specified		URL
38	National Institutes of Health (NIH)	Oak Ridge Associated Universities	Not specified		URL
39	ORNL Electrical engineering post-master's research associate	Oak Ridge Associated Universities	Not specified		URL
40	ORNL C++ Post-bachelor's research associate	Oak Ridge Associated Universities	Not specified		URL
41	Research participation opportunities at the centers for disease control and prevention	Oak Ridge Associated Universities	Not specified		URL

New research publications (count: 233)

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- Ali, M. H., Abilgaziyev, A., & Adair, D. (2019). 4D printing: A critical review of current developments, and future prospects. International Journal of Advanced Manufacturing Technology, doi:10.1007/s00170-019-04258-0
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