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Partnership with US scholars helps keep Ukraine HE alive

Nathan M Greenfield 29 November 2023

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"Without programmes that keep scholars in Ukraine, higher education there will die, will disappear." – Anna Nagurney, Eugene M Isenberg Chair in Integrative Studies in the Isenberg School of Management (ISM), University of Massachusetts, Amherst.

On more than one occasion during the past year and a half, University of Massachusetts Amherst (UMass) Professor Anna Nagurney has found herself sitting in her office in the picturesque Massachusetts town on Zoom calls mentoring researchers and scholars affiliated with the Kyiv School of Economics (KSE) who were sheltering from Russian missiles in the university's bomb shelter.

During one such bombardment, Nagurney, the Eugene M Isenberg Chair in Integrative Studies in UMass' Isenberg School of Management, introduced Dr Pavlo Martyshev to the power mathematical equations that make up the spatial equilibrium model (SEM).

Using the SEM, Martyshev, a researcher with KSE's Kyiv Center for Food and Land Use Research, demonstrated that, contrary to Russia's assertions, Ukraine's exports of wheat and feed corn are vital to both the supply and price stability of these commodities in Lebanon and Egypt. That research has **recently been published** in the *European Journal of Operational Research*.

"It's horrible when their university is bombed," said Nagurney. And yet, referring to Martyshev as well as other researchers she has mentored at KSE, she said: "Their research is fantastic. They have access to interesting data; they're very current and fuelled by adrenaline."



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Then, with a note of pride, she pointed to how their academic resilience in the midst of war has been recognised: "Their papers are coming out in top journals. They are getting invitations to speak and give keynote addresses."

Preserving Ukrainian research

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Ukrainian government officials, including President Volodymyr Zelenskyy, and higher education leaders have spoken often of their gratitude to European and North American universities that have hosted Ukrainian students and faculty on their campuses since the full-scale Russian invasion in February 2022.

However, as Timofii Brik, KSE's provost told *University World News*: "There are plenty of scholars who stayed in Ukraine, and they are often overlooked. Many men have stayed [martial law prevents males aged between 16 and 60 from leaving, though a general mobilisation and conscription has not been instituted] and female scholars with family commitments have stayed. They need support for their labs, for transport, for the means to do their research."

UMass' partnership with KSE, spearheaded by Nagurney, came together quickly, even as Kyiv itself was threatened by Russian troops. In addition to her teaching and administrative duties at UMass, Nagurney is a member of KSE's board of directors.

The partnership is designed to preserve Ukrainian research. Supported by funds from various deans, the provost's office and UMass' International Programs Office, the partnership is divided into two parts. The first is a traditional academic exchange programme that sees undergraduate and graduate students come to the campus in Western Massachusetts for either one or two semesters.

The second, and more innovative, is the virtual Scholar in Residence programme (vSRP). Under it, 15 scholars associated with KSE have been matched with faculty hosts in Amherst. There are nine in Nagurney's ISM, five in the School of Behavioural Sciences and one in the School of Mathematics and Statistics. Each of these Ukrainian scholars are given US\$5,000 (UAH180,000), approximately six months of an average salary) to support their (virtual) access to library and other research resources.

At the August 2022 signing ceremony, Kalpen Trivedi, UMass' vice-provost for global affairs and the director of the International Programs Office, spoke about the need to support Ukrainian scholars in their time of need, about their resilience in the face of the Russian onslaught and what the virtual scholars bring to UMass' table.

"To preserve a strong and independent Ukrainian academic sector is crucial to both the war effort and eventual post-war reconstruction efforts," Trivedi **told** *The PIE News* on 3 August 2022. "The impact of this partnership will be profound and significant. Collaborative research conducted by the virtual scholars and UMass Amherst faculty through this partnership should bring great dividends in the recovery and reconstruction of Ukraine," said Trivedi.

After referencing areas of shared research interests, Trivedi added: "Knowing that academics and universities such as UMass Amherst are supporting them provided our academic colleagues across the miles [with] the strength and determination to continue their critical work."

When it came time for him to speak, Brik made it clear that, for Ukraine, the partnership was existential.

"The future of democracy depends on Ukraine's survival. If you want to support the country, it's best to support education, science and technology in Ukraine."

Beyond a regular empirical approach

Dr Elena Besedina, an economics professor at KSE, and Myroslava Kushnir, a PhD in supply chain management at Ukrainian Catholic University, credit Nagurney with advancing their work by introducing

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Research focuses on production of jet fuel from halophytes

them to new methodologies and the computing power to turn equations into dynamic models, as does Martyshev.

In Martyshev's case, the article he co-authored with Nagurney and two others, goes beyond using empirical econometric models to understand Ukraine's wheat and corn shipments. In 2020 and 2021, the last two years before the full-scale Russian invasion in February 2022, exports of wheat totalled 16 and 16.5 million tons, respectively and 24 and 23 million tons of corn in each year.

SEM allowed us "to construct a multicommodity international agricultural trade network equilibrium model, which contains novel features of capacities on the production and transportation of multiple agricultural commodities to capture competition," the authors write. "The model includes exchange rates and accounts of multiple routes and possibly distinct transportation modes and combinations," they explain.

The complex algorithms Nagurney coached Martyshev through produced a detailed picture of the effects of Russia's war on Ukrainian agricultural exports. The equations showed how both bombings and attempts to choke off bulk shipping through the Black Sea, "reduced production and transportation capacities on food security" in Lebanon and Egypt.

The increased prices that follow from these disruptions, Martyshev argues, are enough to precipitate hunger in these countries.

"In a wider sense, our research can be applied to the international discussion on food security in the MENA [Middle East North Africa] region, which is fragile amidst the political tensions in the Middle East and challenges associated with climate change," he said.

The model in the **paper** that Besedina co-wrote with Nagurney, extends Martyshev's work to include important non-tariff barriers to trade.

Like Martyshev, Besedina is indebted to Nagurney for taking her work beyond the regular empirical approach she was accustomed to. Nagurney introduced Besedina to the world of the complex mathematical models that allowed her to quantify the impact of different factors, such as application of sanitary and phytosanitary measures (designed to protect plants and crops, among countries) on trade flows.

"This is especially important for Ukraine because, after the closure of the Black Sea ports, Ukraine had to ship its grain to the MENA countries by train or via the Danube through other countries which had different non-tariff regulations.

"All this adds to the cost of shipping and increases the price for importing countries and reduces the price for Ukrainian exporters [who, to compete, must lower their prices]. Professor Nagurney's models allowed us to see these changes in transportation routes and other factors affecting trade in the spatial [geographical] context," Besedina explained.

Referring to these two papers, Nagurney told *University World News* they are relevant in other situations, including the economic fallout from the Israel-Hamas war (Israel's agricultural sector is struggling because so many workers have left) and the drop in shipping through the Panama Canal because of climate change.

"Because of climate change, they can't ship as many big ships through it, which sets a boundary. You have a capacity, a production capacity and transportation. What does that do to prices, to food insecurity?" said Nagurney.

UAE University staff

With an eye to developing a clean, alternative aviation fuel to reduce carbon emissions, researchers at the United Arab Emirates University have been focusing on the production of jet fuel from sustainable resources such as halophytes, which are salt-tolerant plants that could be cultivated on a wider scale in the region's coastal areas.

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The value of being human: How teachers can work alongside AI

Michael Milligan

Artificial intelligence is now a part of our evolution in technology and teachers need to be encouraged to find ways to bring AI into the classroom and have students use it in a way that is beneficial to them in the long term.

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As water scarcity reaches critical levels globally, a research team at the United Arab Emirates University seeks to revolutionise seawater desalination practices, offering a path to mitigate water scarcity while championing environmental preservation.

Before the full-scale Russian invasion, Kushnir's academic focus was on supply chain management. After the invasion, she turned her research towards military purposes and concentrated on how to make the Ukrainian army's logistics more efficient.

As a civilian, her specialty is called 'insurgency'. However, as she writes in a paper that will be delivered at the Information Systems for Crisis Response and Management conference in Münster, Germany next May, in this case 'insurgency' does not mean "armed struggle by the civilian population to overthrow the government".

Rather, 'insurgency' means "a system in which the civilians are the key in supplying the Ukrainian military. They provide the military with ammunition, food, transport, medical supplies, warehouses, and act as the main channels for information transmission".

A central part of her analysis is how to ensure that the reordering of Ukraine's civilian economy, which is largely supported by foreign monetary donations, to, for example, produce drones, does not become leaky.

"An important way of doing this is to manufacture what is needed in Ukraine," she said. "That way, funds donated to Ukraine do not end up abroad and manufacturers in Ukraine can contribute to the economy," she added.

'This is my country'

When asked what the vSRP has meant to them, each of the Ukrainian scholars began by saying how Nagurney inspired them and deepened their analysis, transforming it from being advances in their academic fields to being contributions to Ukraine's struggle for survival.

Further, as Kushnir explained, the vSRP has provided her with "the possibility to be heard" by her international peers. This recognition of the work she (and others) undertake *in extremis* fosters her belief that the purpose of the complicated equations in her work is, ultimately, to show scholars and policy makers outside Ukraine that: "We are in the same boat".

For her part, Besedina told *University World News* that the vSRP validated her decision to turn down the invitation to work at Bocconi University in Milan, where she did her graduate work, and stay in Ukraine.

"This is my country. What if everyone goes? Who is going to work? Who's going to teach the students here?" she asked rhetorically, before putting on her economist's hat: "If you're staying in Ukraine, you're working and paying taxes."

Earlier in the discussion Besedina made clear that since she does not have children she is in a different position to those scholars with young children, who may have accepted offers to teach elsewhere so as to avoid subjecting their children to the trauma of bombardment.

Resilience, Besedina said, comes from having a purpose, whether it is volunteering, as she does, to make 'kikimores' (camouflage military clothing), or writing papers about spatial price equilibrium and exchange rates.

The vSRP, "has allowed me to develop myself further, so I will be a better professor. I will be a better teacher for our students. It helped me grow as a professional", she said.

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