EAGER IMPRESS-U: ***Resilient Engineering to Advance Public Value and Innovation in Research Periphery Countries (REAPv)***

PIs: Julia Melkers, Molly Ott and Kurt Paterson (Arizona State University)

PROJECT SUMMARY

Higher education institutions in Research Periphery Countries (RPC) function within difficult funding and policy environments, but conditions of conflict and war elevate these challenges to extraordinary levels. Grounded in the emerging theoretical framework of crisis science, our proposed project focuses on engineering as a discipline, which is transforming to be more responsive to public. Using a case-based and comparative research design, we identify critical factors in the academic engineering ecosystems that hinder or support engineering department innovations and transformation. We examine aspirational strategies as well as implemented exemplars of these transformational We examine elements that support or deter their success to provide foundation for the development of the typology of engineering transformation in RPC higher education. We ask: *What policy, institutional, structural, and cultural factors determine or hinder the successful implementation of innovations in academic engineering programs during times of crisis?* The two-year work plan includes six primary work activities: I) Literature review and team seminars; II) Case selection and interview protocol development; III) Data collection; IV)Coding and typology development; V)Writing/ manuscript submissions; and VI) International partner engagement and final workshop. <u>International partners include</u>: **UKRAINE**: Nataliya Chukhray* (Lviv Polytechnic National U.), Oleksandra Mryhkina (Lviv Polytechnic National U.), Oksana Boryushkina (State Biotechnological U.), Iryna Nechitailo (Kharkiv Natl U. of Internal Affairs), Oleh Matviikiv (Lviv Polytechnic National U.); **ESTONIA**: Kai Pata (Tallinn U.), Merja Bauters (Tallinn U.); **LATVIA**: Agrita Kiopa (Riga Stradiņš U.), Ieva Puzo (Riga Stradiņš U.), Tatjana Tambovceva (Riga Technical U.), Ilze Jankovska (Riga Technical U.), Gemma Derrick (U. of Bristol/Riga Stradiņš U.), Kamil Luczaj (U. of Lodz/Riga Tech U.); **LITHUANIA**: Žilvinas Martinaitis (Vilnius U.), Aurelija Ulbinaitė (Vilnius U.), Rūta Petkutė-Budrė (Kaunas U. of Technology), Milda Ratkevičienė (Kaunas U. of Technology); POLAND: Marta Shaw (Jagiellonian U.), Anna Waligora (Silesian U. of Technology), Agnieszka Olechnicka (U. of Warsaw), Kamila Lewandowska (U. of Warsaw), Marcin Górski (Silesian U. of Technology).

<u>Intellectual Merit</u>

Highly salient to the region, crisis science brings additional theoretical dimension to the challenges faced by academic engineering programs and HEIs in advancing research, innovation and professional transformation. The results of this study will offer empirical insight into what “crisis engineering” entails in RPC countries and institutions, and how it may be applied to higher education leadership decisions. Our proposed project contributes by investigating how the co-existing RPC and crisis contexts provide opportunities as well as challenges to HEI engineering. Our study also incorporates issues of cultural norms, institutions and policies that may have an impact (positive or negative) on institutional and policy change. Using a case-based and comparative research design, we will deeply examine how HEIs, and individual engineering faculty and leadership, “re-focus” their approaches to engineering research and education. More broadly, it will contribute to the growing body of work on crisis science and engineering.

<u>Broader Impacts</u>

Our goal is to produce a synthesis of ecosystems factors, as well as best practices and promising models pertaining to collaborative research and educational initiatives that can serve as a guide for Ukrainian partners as well as other RPC HEIs. We also seek to learn from failures or missed opportunities that can also inform future strategies. What we propose is potentially transformative for Ukrainian higher education and other partner institutions because it builds on lessons learned from countries in the region that have successfully navigated a range of political, economic, and cultural challenges. In addition to scholarly products, the project’s final workshop will contribute to immediate and broader global impacts. We also create a foundation for ongoing collaboration and translational activities, including the training of early career scholars in the substance and methods of this project. Additionally, our work could translate insights in designing academic engineering to be part of the strategy in building resilience against geopolitical stressors and other emerging uncertainties (e.g., climate change, natural disasters, pandemics, migrations, etc.).