A premier funder of basic research, the U.S. National Science Foundation (NSF) comprises seven directorates that provide critical support to psychological scientists, including the Directorate for Social, Behavioral, and Economic Sciences and the Directorate for Education and Human Resources. In 2020, NSF’s budget was $8.3 billion.

In 2020, NSF launched the Strengthening American Infrastructure (SAI) program to stimulate research to strengthen U.S. infrastructure in the physical, cyber, and social domains. The program supports interdisciplinary research that incorporates scientific insights about human behavior and social dynamics to better create, rehabilitate, and maintain strong and effective American infrastructure. The EAGER (Early-concept Grants for Exploratory Research) mechanism supports exploratory research in its early stages. Researchers are encouraged to propose projects that apply different approaches, apply new expertise, and engage interdisciplinary perspectives.

**Grant Information**

- Country/Region: United States
- Organization: National Science Foundation
Grant Mechanism: EAGER—Strengthening American Infrastructure
Amount: $300,000

Emily Balcetis is a social psychologist and associate professor of psychology at New York University. She focuses on how people’s motivations, emotions, needs, and goals impact the ways they perceive and interpret information around them. Her work explores motivational biases in visual and social perception and their consequences for behavior and navigation in the social world. She received an EAGER grant from NSF, awarded via the SAI program, for a project titled “Understanding Misperceptions of Cyber Risks to Model and Secure Transportation Infrastructures.”

Emily Balcetis

What are you researching?

I partnered with a data scientist in electrical and computer engineering, Quanyan Zhu, and a professor in planning and public administration, Rae Zimmerman, to understand cyber risks to the U.S. transportation system that are affected by people’s inabilities to determine the risks posed by their choices online.
For example, vehicles commonly feature network-connected entertainment and communication systems. If people’s personal information such as passwords become compromised, attackers can gain access to accounts that interface with their cars and control essential automotive functions. This can result in disruption of communication or denial of service within connected vehicles, congestion, collisions, injury, or even death. In other words, keeping passwords to digital music streaming services safe might help prevent events like multicable pileups! This project tests vulnerabilities in cybersecurity for individual users, their connected devices, and the transportation infrastructures to which those devices are linked.

How has the NSF SAI program supported your research and training?

The funding allowed our team to use eye-tracking technology that monitors where people are looking without their awareness. The goal is to understand why people sometimes fail to understand the degree to which their choices jeopardize their own and their communities’ cybersecurity, but also really to understand why those mistakes happen. For example, companies commonly employ scare tactics to teach individuals about cybersecurity. They might say things like, “Clicking on a link from a person you don’t know poses a risk, and about half the people in your firm have done it.” This kind of base-rate information could be useful to know, because it could signal that I have a one-in-two chance of doing something dangerous. But our early results show that people do not use this kind of base-rate information when they’re thinking about their own risk. In fact, eye-tracking technology shows us that people don’t even really look at those kinds of statistics.

Our current work will expand on these early findings to determine who does find these informative base rates useful and if these base rates do improve their risk determinations. I’ll also rely on my engineering and public-planning collaborators to create computational models to simulate human risk behaviors and study their effects on transportation infrastructure. Without actually posing any risk to people or their communities, we can use statistical modeling based on the actual judgments of drivers in Manhattan’s Lower East Side to explore the impact of their errors in risk assessment. We can estimate the likelihood that they might have credentials stolen and study the potential consequences, including road accidents and congestion, if an attacker were to take control of a connected automotive vehicle. The project leverages knowledge of individuals’ attitudes to better calibrate risk, reduce the odds of attack, and protect the transportation infrastructure. By integrating behavioral data and computer science, the project aims to improve the security of the U.S. national transportation infrastructure.

What was the application process like?

The EAGER mechanism requires researchers to generate their proposal quickly. The acronym implies this urgency. NSF wants to use this mechanism to address problems facing society now, using research teams who are ready to tackle the problems. So, the program officers were quick to offer feedback and move forward with our proposal.

What advice do you have for researchers applying for EAGER grants?

Generate a one-page pitch of your idea that sells the theoretical advances, broader impacts, and nature of the team you’ve created to test the idea. Send that one-pager to a program officer who oversees a program that seems to best match with your research goals. If they don’t see potential, you can ask other program officers, but you’ll need to disclose the fact that another program officer saw the one-pager and
did not think it a good fit.

Learn more about the NSF Strengthening American Infrastructure program.

Interested in learning more about funding opportunities for psychological scientists? Visit the Funding and Policy page for updates.

Why is psychological science research important for programs such as Strengthening American Infrastructure? And what can other psychological scientists do to get involved?

Infrastructure is a multifaceted term that fundamentally relies on and exists because of the human experience. Understanding the individuals who create, contribute to, and shape the development of infrastructure is critical to determining its strengths and weaknesses. If you want to know why a camera embedded in a driverless car can’t identify a visual object as a person, yes, you can look at whether the camera’s lens is cracked… but you should also look deeper at the biases of the people who created the algorithms. That understanding will give you greater leverage in solving the problem than simply looking at the technology itself.

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