

# Groundbreaking Research Sheds Light on Ancient Mystery

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A researcher at Rochester Institute of Technology is unraveling a mystery surrounding Easter Island. William Basener, assistant professor of mathematics, has created the first mathematical formula to accurately model the island's monumental societal collapse.

Between 1200 and 1500 A.D., the small, remote island, 2,000 miles off the coast of Chile, was inhabited by over 10,000 people and had a relatively sophisticated and technologically advanced society. During this time, inhabitants used large boats for fishing and navigation, constructed numerous buildings and built many of the large statues, known as Tiki Gods, for which the island is now best known. However, by the late 18th century, when European explorers first discovered the island, the population had dropped to 2,000 and islanders were living in near primitive conditions, with almost all elements of the previous society completely wiped out.

“The reasons behind the Easter Island population crash are complex but do stem from the fact that the inhabitants eventually ran out of finite resources, including food and building materials, causing a massive famine and the collapse of their society,” Basener says. “Unfortunately, none of the current mathematical models used to study population development predict this sort of growth and quick decay in human communities.”

Population scientists use differential equation models to mimic the development of a society and predict how that population will change

over time. Since incidents like Easter Island do not follow the normal progression of most societies, entirely new equations were needed to model the outcome. Computer simulations using Basener's formula predict values very close to the actual archeological findings on Easter Island. His team's results were recently published in SIAM Journal of Applied Math.

Basener will next use his formula to analyze the collapse of the Mayan and Viking populations. He also hopes to modify his work to predict population changes in modern day societies.

"It is my hope this research can be used to create a better understanding of past societies," Basener adds. "It will also eventually help scientists and governments develop better population management skills to avert future famines and population collapses."

Basener's research was done in collaboration with David Ross, visiting professor of mathematics at the University of Virginia, mathematicians Bernie Brooks, Mike Radin and Tamas Wiandt and a group of RIT mathematics students.

Source: Rochester Institute of Technology

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