

Journal of Emerging Investigators

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Philadelphia area middle school students use computer simulations to develop innovative safety corridors to minimize human-cheetah conflict; findings published in scientific journal

Sibling team Evelyn and Joseph Acton, students at Keith Valley Middle School in Horsham, PA, recently published a scientific manuscript titled, "Simulations of Cheetah Roaming Demonstrate the Effect of Safety Corridors on Genetic Diversity and Human-Cheetah Conflict" in the *Journal of Emerging Investigators*.

The Actons' article, published on April 2, 2018, examines declining cheetah population density as well as decreased genetic diversity. In their research, they note that there are estimated to be fewer than 7,100 cheetahs remaining globally, which only inhabit 9% of their historic range. Human-cheetah conflict is mainly to blame, but the diminished population, as a result, has caused wild-born African cheetahs to have a 95% homozygous genome, further leaving them susceptible to disease. In an essay the Actons wrote in 2016 for the Cheetah Conservation Fund, they proposed the construction of "Safety Corridors", which is a strip of contiguous land within the habitat of the species. The Actons note that instead of the safety corridors excluding humans entirely, they would involve the education and engagement of the human population within the corridor such that human-cheetah interactions no longer lead to cheetah nor livestock death.

The Actons used computer software to simulate random movement of two groups of cheetahs within a defined area that was also inhabited by humans. When cheetahs in the simulation came within a certain distance of humans, there was a certain probability that the cheetah would be killed. With this model, the mean cheetah lifespan without the safety corridor was typically < 1 year for the highest population densities. With the addition of a safety corridor with a width of 90km, the cheetah's expected mean lifespan increased dramatically to 5-6 years. The Actons also found that cheetah life expectancy was strongly related to both corridor width and human population density within the corridor. This research provides instrumental data that can be used to sustain cheetah populations with little impact on humans in the affected area.

The *Journal of Emerging Investigators (JEI)* is a non-profit scientific journal operated by graduate students at Harvard University. JEI is dedicated to mentoring young scientists in middle and high school and publishing their research through the online journal. Articles submitted to JEI pass through a rigorous editorial and scientific review process by several PhD-level scientists before they are accepted and published.

Link to The Actons' article: <https://emerginginvestigators.org/articles/simulations-of-cheetah-roaming-demonstrate-the-effect-of-safety-corridors-on-genetic-diversity-and-human-cheetah-conflict>

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