

MOUNTAIN

Who Owns the Skies?

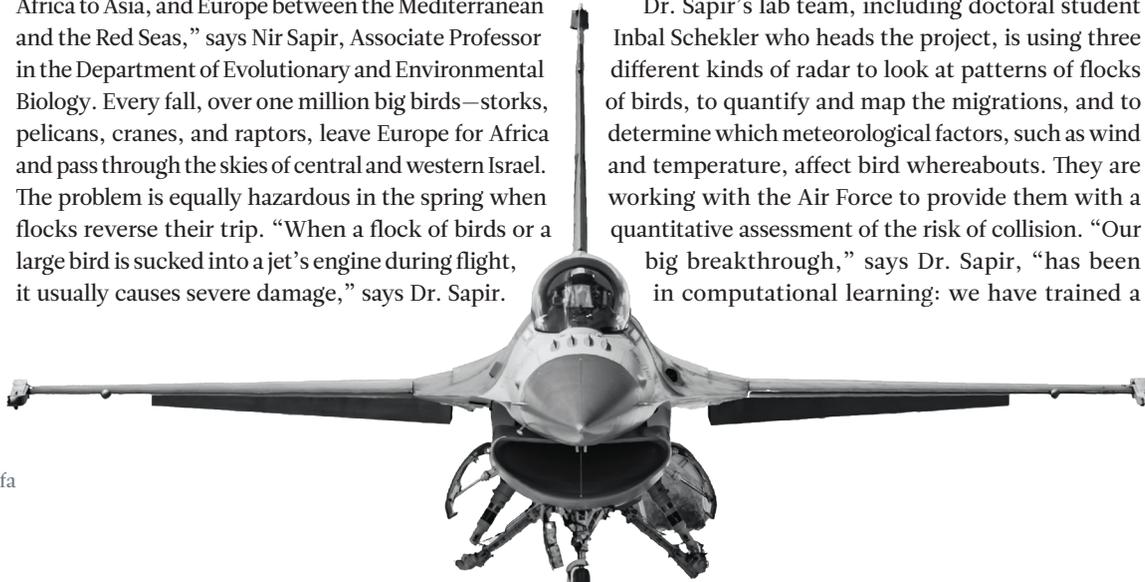


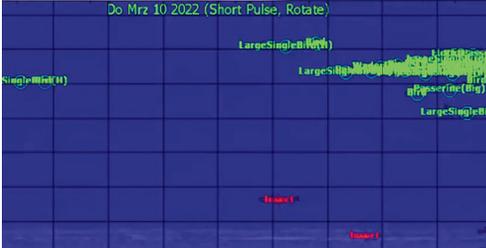
UofH scientists are developing computational learning systems to protect birds and aircrafts in flight

In Israel, the Air Force, which trains at low altitudes, competes against great flocks of large-sized, migrating birds; hundreds of collisions occur, each year. “We are in a narrow land bridge, connecting Africa to Asia, and Europe between the Mediterranean and the Red Seas,” says Nir Sapir, Associate Professor in the Department of Evolutionary and Environmental Biology. Every fall, over one million big birds—storks, pelicans, cranes, and raptors, leave Europe for Africa and pass through the skies of central and western Israel. The problem is equally hazardous in the spring when flocks reverse their trip. “When a flock of birds or a large bird is sucked into a jet’s engine during flight, it usually causes severe damage,” says Dr. Sapir.

“Last year, the Israeli Air Force spent about 4.5 million shekels to repair and replace bird-damaged engines. Engine failure could even result in an airplane crash, putting the pilots’ lives at risk.”

Dr. Sapir’s lab team, including doctoral student Inbal Schekler who heads the project, is using three different kinds of radar to look at patterns of flocks of birds, to quantify and map the migrations, and to determine which meteorological factors, such as wind and temperature, affect bird whereabouts. They are working with the Air Force to provide them with a quantitative assessment of the risk of collision. “Our big breakthrough,” says Dr. Sapir, “has been in computational learning: we have trained a

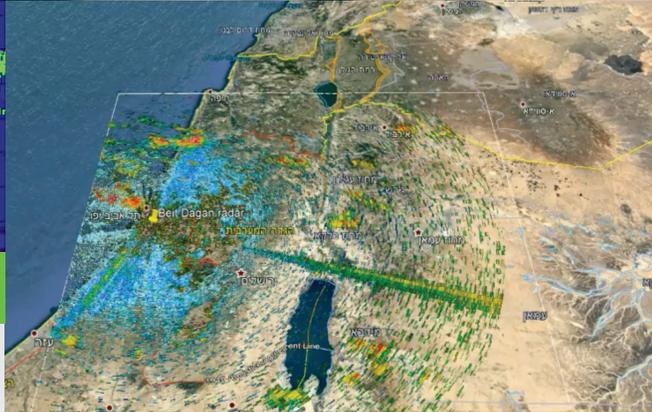




Flying animals detected by the MRI-BirdScan bird radar positioned at the Hula Valley.



Bird migration radar at Ramon



Emergence of migrating birds from their stopover sites located in the greater Tel-Aviv area on their southward migration across the Sahara Desert.

Dr. Nir Sapir

is the Director of the Animal Flight Lab at the Department of Evolutionary and Environmental Biology. Much of his animal movement study is based at the Hula Valley in the Upper Galilee.

computer to identify the flocks using images from weather radars. This information assists us to separate the planes and the birds to mitigate hazards to aircrafts. Now we are trying to develop real-time mapping of the flocks and this information will be provided to the Airforce control units and the pilots. Then, our next goal is to predict when and where bird flocks will occur three days in advance." Currently, more data is being collected to increase the predictability of the model, which may be fully operational next year. The model will be shared with northern European nations, which have problems with geese colliding with aircrafts.

"Israel is among the best places in the world to study bird migration, given the tremendous number and variety of species," says Dr. Sapir. "We are the only university in Israel working on predicting, daily, the exact density of migrating bird flocks and the risk for collision." While ISF* and the University provided funding for the project, some of the tools used are based on a COST Action, an EU-funded research network program. "We continue to work with colleagues from several European countries, as well as from the US, to share tools that are helping us tackle this worrisome, and potentially dangerous situation," says Dr. Sapir.



Prof. Nir Sapir, Inbal Schekler, Korin Reznikov, Yuval Werber, and Tsafr Tzori

*ISF: Israel Science Foundation