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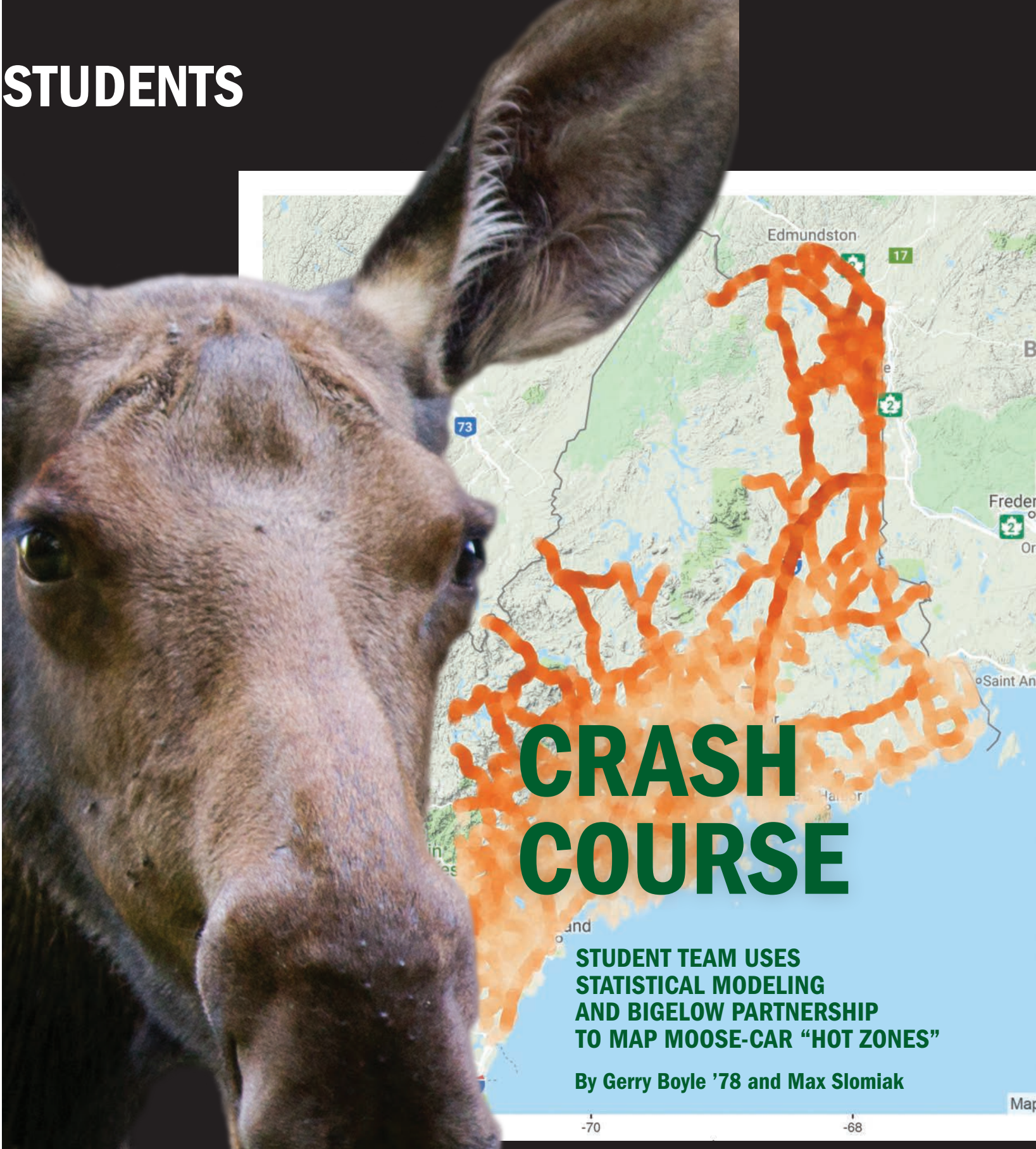
# Crash Course: Student Team Uses Statistical Modeling and Bigelow Partnership to Map Moose-Car "Hot Zones"

Gerry Boyle

Max Slomiak




# CRASH COURSE

## STUDENT TEAM USES STATISTICAL MODELING AND BIGELOW PARTNERSHIP TO MAP MOOSE-CAR "HOT ZONES"

By Gerry Boyle '78 and Max Slomiak

Beijing native Yue "Anna" Yu '19 saw her first moose as she hiked through the Maine woods during orientation. Four years later she's "seen" thousands, each one represented by a dot on a computer screen showing where one of the iconic animals has been struck by a car.

The project began in 2004 when Alex Jospe '06, a Nordic skier who traveled Maine roads to meets, decided to use skills learned in a GIS class taught by Associate Professor of Environmental Studies Philip Nyhus. Jospe used data supplied by state transportation officials to map moose-collision hot zones. On a trip to Vermont, the map came in handy. "She came back all excited and said, 'I saw a moose right where my map said I would,'" Nyhus recalled.

Science and technology have come a long way since then, and so has this latest stage of the study.

Yu and research partner Jiaqi "Carmen" Wu '19 began working for Nyhus on the project in the summer of 2017. The pair tapped Associate Professor of Statistics Jim Scott for his expertise in statistical modeling. Then, fresh from a stint studying human/wildlife interaction in Botswana earlier this year, Yu began consulting with Nick Record, an ecosystem modeling expert at the Bigelow Laboratory for Ocean Sciences who has been collaborating with Nyhus on the project since its inception, and Bigelow researcher Ben Tupper.

The partnership has enabled Yu to combine GIS data with a program called Maxent that is used for modeling species distributions. From her office in the Diamond Building, Yu is in frequent contact with Colby and Bigelow scientists as she feeds spatial variables (such as road speed, grade, type of vegetation cover, distance to water) and temporal variables (time of day and season, weather conditions) into a statistical model to develop a predictive model of moose-vehicle collisions.

"There are a lot of follow-up questions we want to explore," Yu said. "Which variables make the most contribution? What combination of variables makes the most sense?"

Nyhus said that, to his knowledge, nobody has used real-time data to try and create a moose/vehicle collision forecast. "We could potentially have, at least at an experimental level, a real-time moose/vehicle collision model that would help to highlight where in Maine at any given time of the year you are more likely to have the risk of a collision with a moose."

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>
> —Anna Yu

He said work being done by Yu and other students proves that sophisticated and important research will increasingly be done at Colby.

"We have a growing number of students with really advanced computational skills," Nyhus said. "A student like Anna is combining upper-level GIS skills. She's also using 'R' for statistics. And then she's linking that with the Maxent program. Students are able to do graduate level work to do things that have real societal significance."

Yu, meanwhile, plans to continue the project as her senior honors thesis, something she couldn't have predicted the first time she laid eyes on a moose three years ago. "My COOT parents, they just told me this is a very typical Maine signature animal," she said. And if the project is successful, Maine's signature animal and motorists will meet unexpectedly less often.