

Pamela Reed Sanchez

Students display the 3D imaging device at Imagine RIT.

An unstoppable partnership: Seneca Park Zoo and Rochester Institute of Technology

Understanding biodiversity through audio recordings. Quantifying the conservation impact of planting native vs. non-native pollinator plants. Cracking a way to take 3D image of specimens in the field. Training next generation zoo keepers. These are just a few of the examples of how a strategic partnership with Rochester Institute of Technology (RIT) has benefited the Zoo and our conservation efforts.

Both Monroe County and Seneca Park Zoo Society staff have worked with RIT on various projects for years. In May 2017, the Society entered a formal, strategic partnership with RIT with the goal of identifying and exploring real-world opportunities for RIT students and faculty to work with the Zoo and Zoo Society to tackle conservation and business opportunities together.

An advisory team of faculty has helped prioritize the myriad opportunities for collaboration to ensure they are mutually beneficial for both organizations. The results so far have surpassed the expectations of everyone involved.

“The partnership with the Zoo Society is clearly a case where the whole is greater than the sum of its parts.” Commented Dr. James Winebrake, Dean of the College of Liberal Arts at RIT. “Together we have identified projects that not only provide our students with a rich set of learning experience but also enhance the expertise and knowledge of the Zoo and improve its operations.”

The areas of collaboration include single semester projects,

multi-year research studies and capstone courses, an internship program, and many situations where RIT staff serve on committees or work on specific projects for the Zoo. Here are just a few examples of the partnership at work.

3D imaging of specimens in situ

In 2018, the Zoo introduced the Center for Biodiversity Exploration, a gaming experience to connect Zoo guests with the impact of their actions on an ecosystem. The game was designed with support from two RIT co-op students. The next phase of the game will include multi-player opportunities, as well as additional ecosystems beyond the current Genesee River game.

One challenge: It takes considerable time to model the needed 3D representations of species for the games. Using traditional modeling, a game programmer can take up to 40 hours to create one specimen. This challenge was presented to a team of freshmen Imaging Science students.

The team created a prototype that enables creation of a 3D image of a physical specimen in just minutes. Using a dome housing 32 cameras and more than 100 feet of lighting, coupled with unique software to process the data of all the simultaneous pictures, the assets to create 3D models are possible at scale. They also made the imaging device portable, so a researcher can take it into the field.

RIT Professor Anthony Vodacek and Tom Snyder, the Zoo Society’s Director of Programming and Conservation Action, tested the device recently in Madagascar, with great success. The team has now created a more robust version which they displayed at Imagine RIT in April.



“The most interesting projects may be the ones we can’t even conceive of yet. The rapid pace of technological change, from new data management systems to artificial intelligence, will continue to create challenges and opportunities for the partnership to explore.”

-Dr. James Winebrake, Dean of the College of Liberal Arts at RIT

Wayne Smith

A feeder system for Amur tiger Katya is being created by RIT faculty.

Creating enrichment for tigers

In their natural range, Amur tigers have to hunt for food. At zoos like ours they have zoo keepers who feed them. This creates a paradigm where people = food to the tiger. Working with RIT professor Mark Olles, Dr. Louis and the veterinary team are working to create an automatic feeder that will provide intermittent feedings that can’t be predicted by Katya, our resident tiger. The feeder will have multiple distribution points in the habitat, and animal care team will program it to open at seemingly random occurrences (while all managed to deliver the prescribed dietary balance the tiger needs each day).

“This device will increase exploration by Katya, and give her more behavioral diversity,” commented Dr. Louis, “Having some unpredictability in her routine is a good thing,” he added.

The introduction of the feeder will be coupled with a behavioral observation study, conducted by Zoo staff and docents, to measure the impact on the tiger’s behavior overall.

Understanding the impact of Pollinator Gardens

The Zoo’s Butterfly Beltway program re-establishes pollinator habitat using plants native to western New York. Increasingly, organizations in our region are planting pollinator habitat rather than mowing roadside grassy areas.

In theory it’s a win-win: more pollinator habitat in addition to cost savings and positive environmental impact of less mowing. The Zoo has also been exploring the possibility of planting pollinator habitat in abandoned lots in urban areas as well.

A team of faculty from RIT have taken on a comprehensive view of pollinator habitat in roadside and urban areas as part of a multi-year capstone course, engaging several classes of students over a several-year period. The project is intended to evaluate plant adaptability to roadsides and urban areas, identify new areas for restoration, and develop management recommendations.

Its components include evaluating local vs. non-local strains of milkweed efficacy, evaluating pollinator use of the specific plants in the Butterfly Beltway seed mix vs. more traditionally accessible mixes, and mapping specific sites for future pollinator gardens in vacant lots.

Additionally, a team of economics students will be doing a cost-benefit economic analysis of converting grassy areas to pollinator gardens.

“I love it when multiple disciplines come together,” commented Kaitlin Stack Whitney, Visiting Assistant Professor in the Science, Technology, & Society Department and co-chair of the RIT-SPZS partnership committee. “We’re giving students insight into what it’s like to work professionally, with real world examples,” she added.

Figure 1

SPZS pollinator mix plant species

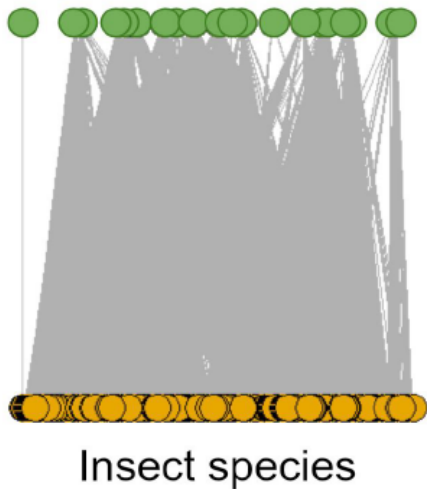


Figure 1: Bipartite graph of the plan-pollinator network for the Seneca Park Zoo Society's seed mix. There are 27 plant species that could potentially support 520 species of pollinating insects in Western, NY.

Figure 2

Common Roadside plant species

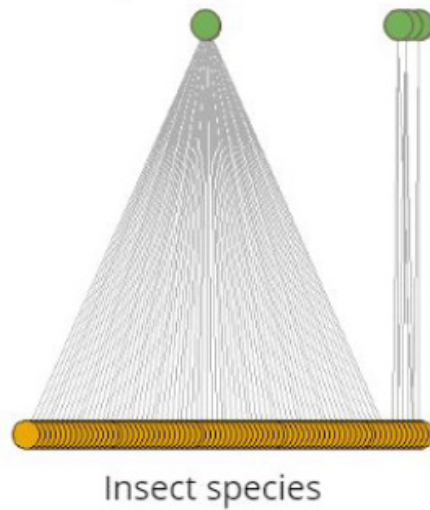


Figure 2: Bipartite graph of the plan-pollinator network for the General Roadside seed mix. There are 4 plant species that could potentially support 77 species of pollinating insects in western, NY.



Interns prep diet for animals, help clean habitats, develop enrichment, and more.



Next generation animal care

For over a decade, Seneca Park Zoo has partnered with RIT Thomas H. Gosnell School of Life Sciences to provide Animal Care internship opportunities to third and fourth year Biology and Environmental Sciences students. The semester-long program includes a weekly lecture and a weekly full-day shift working hands-on with the animal care team at the Zoo. Under the direction of General Curator David Hamilton, the 10-12 students per year experience the life of a zoo keeper, including maintaining habitats, diet prep, creating behavioral enrichment, and more.

The lecture portion of the class covers population genetics, management of animals with Species Survival Plans,

research and conservation work in zoos, and education of guests through programs and interpretive graphics. Several interns through the years have gone on to graduate school, or to become veterinarians or zoo keepers.

The future of the partnership

One thing is clear: the possibilities of this partnership are limitless. Where is the partnership headed?

“The most interesting projects may be the ones we can’t even conceive of yet. The rapid pace of technological change, from new data management systems to artificial intelligence, will continue to create challenges and opportunities for the partnership to explore,” concluded Winebrake.