



ART MATTERS. SCIENCE MATTERS. MATERIALS MATTER.

Students gain insights at the intersection of beauty and utility

By Rachael Flores

For the past decade, colleges have seen a decline in the number of students studying the arts and humanities. It's a trend that started in response to the 2008 stock market crash when there was a fear that building a career with a humanities degree would be more difficult.

Some schools responded by cutting programs. At Binghamton University, faculty and staff decided to innovate instead of retreat.

An interdisciplinary approach revealed an avenue for changing misconceptions about the value of the arts and humanities, starting

with a class about materials: glass, ceramics and paint. In fact, the National Endowment for the Humanities (NEH) was so impressed with Binghamton University's response that the course received \$100,000 of funding over the next three years.

That class, called Materials Matter, is a place where an engineering student can learn why a vase has value and a history student can become comfortable with chemistry.

The architects of the class are members of one of Binghamton University's six Transdisciplinary Areas of Excellence (TAE). A TAE brings together a cohort of professors and administrators from across disciplines to develop new, collaborative research initiatives.

Pamela Smart, associate professor of art history and anthropology, and Valerie Imbruce '99, director of the Undergraduate Research Center and External Scholarships, are two of the seven core members of the Material and Visual Worlds TAE. The women are also co-directors of the Materials Matter project.

Smart says that ongoing conversations among the TAE group revealed that the scientists wanted their students to better understand the importance of arts and humanities, while the humanities faculty knew their students needed more skills in science.

"Undergraduate science students tend to learn chemistry as an abstract discipline, divorced from the materials it produces and distant from the historical and social circumstances



of their discovery, manufacture and use,” she says. “Materials Matter is meant to bring science to life, for science students and for arts and humanities students, alike. And it gives students in the arts and humanities new insight into things that they might otherwise have only understood as artifacts of history or objects of desire or utility.

“Putting science, art and the humanities into conversation with each other gives students a much richer array of perspectives and methodologies to apply to their understanding of the world, just as a liberal arts education should.”

With the backing of the TAE, Materials Matter became an experiment in repositioning the humanities in concert with STEM fields.

Why materials?

The course looks specifically at three materials — glass, ceramics and paint — that illuminate the connections between the arts, humanities and STEM fields. But the choice to focus the class on materials was not an arbitrary one.

“We are familiar with materials, but few of us know much about them,” Smart says.

Materials are positioned at the intersection of physical, human and social processes.

“Not only are glass, ceramics and paint important to artists and social history but they each have a rich foundation in the sciences,” Smart says. “Artists work side-by-side with scientists and engineers to understand how materials lay on canvas or how to develop something completely new for a special project.

“We saw materials as a place where students



The Materials Matter course started as a scholars class, funded with seed money. The students produced an exhibit called “Amorphous: A Graphic Exploration of Glass.”

REFLECTION OF LIGHT OFF BLUE GLASS

White light travels into the glass in different colored wavelengths and reflects back at different intensities. Some colors are absorbed into the glass more than others. These differences of absorption determine the color that is seen when looking at the glass.

THE TEAM

MEMBERS OF MATERIALS MATTER

Each member of the **Materials Matter** team brings a specific expertise to the Visual and Material Worlds Transdisciplinary Area of Excellence. They are supported by teaching assistants, contributing lecturers and industry partners.

THE CORE TEAM IS:

Pamela Smart, associate professor of art history and anthropology

Valerie Imbruce '99, director of the Undergraduate Research Center and director of the Office of External Scholarships, Fellowships and Awards

Mark Poliks, professor of systems science and industrial engineering

Louis Piper, associate professor of physics, applied physics and astronomy and director of the materials science and engineering program

Hilary Becker, assistant professor of classical studies

Gokhan Ersan, assistant professor of art and design

Kevin Lahoda '98, adjunct lecturer of art and design

THE TRANSDISCIPLINARY AREAS OF EXCELLENCE

In 2013, Binghamton University developed a new approach to hiring faculty and supporting research by creating Transdisciplinary Areas of Excellence (TAEs). All are areas of inquiry in which Binghamton has developed strength in research and graduate education.

There are six TAEs:

Material and Visual Worlds

Citizenship, Rights and Cultural Belonging

Data Science

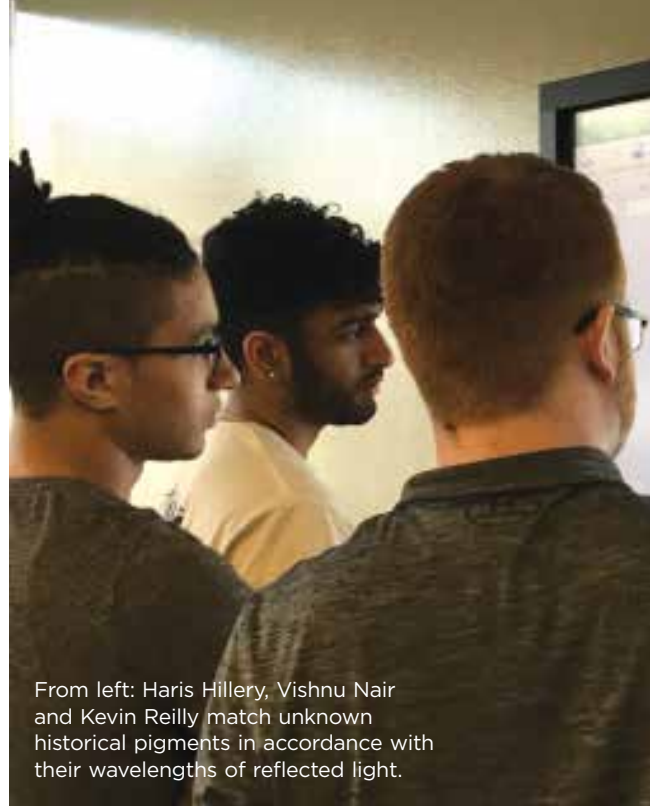
Health Sciences

Smart Energy

Sustainable Communities

could gain a deeper understanding through transdisciplinary work," she says.

The course was first tested on students from the Binghamton University Scholars Program. The small, boutique class — funded with grants — was ambitious in its scope, though it focused exclusively on pigment. The syllabus was built collaboratively with contributions from professors of a variety of disciplines; then it was



From left: Haris Hillery, Vishnu Nair and Kevin Reilly match unknown historical pigments in accordance with their wavelengths of reflected light.

taught by TAE team members Hilary Becker, assistant professor of classical studies, and Todd Rutkowski, a physics PhD student.

Student response was enthusiastic.

Jessica Gutowitz, a student in the initial course, described it as “a welcome workout for both our left and right brains, seamlessly weaving together the narratives of both scientific experimentation and ancient Roman art.”

With the NEH funding, the course this spring has been scaled up to accommodate 60 students and two teaching assistants.

Teaming up with collaborators

Because of the nature of the course, there are numerous guest lecturers and a variety of outside-the-classroom experiences. A partnership with the Corning Museum of Glass and Golden Artist Colors gives students exemplars of companies that rely on both science and art to understand the materials they work with.

The laboratory assignments and the assessment tools had to be designed to include what Smart describes as a “symmetry between humanities and science, without one ever overpowering the other.”

The course is the first general education class at Binghamton University to be given both a laboratory science and an aesthetics designation. It's also the first interdisciplinary undergraduate course developed by a TAE.

“It's not just an academic exercise. We wanted



to make sure students could get the most out of their general education requirements,” says Imbruce, who was instrumental in implementing the class and will continually evaluate it.

Junior Emily Jelen, a double major in biology and art history, says she was intrigued by the interdisciplinary nature of Materials Matter course, which she is taking this spring.

“This course enables me to think more about the science behind everyday objects such as the materials that create a certain color in a painting and the way our eyes perceive that color. It has given me not only the opportunity to view art through a more scientific lens, but to view science creatively as well,” she says. “This course has taught me to think more critically and holistically about the way I observe the world around me.”

NEH funding will, for the duration of the grant, not only support the Materials Matter class but also give students opportunities to pursue the transdisciplinary work in other contexts.

Students will be able to take part in this year’s Summer Scholars and Artists Program to focus on materials-based research projects with supervision from faculty on the Materials Matter team.

Team members will also contribute a new course sequence to the Source Project, a research-intensive freshman initiative developed by the Undergraduate Research Center.

“The Source Project is intended to give students in the arts, humanities and social sciences the opportunity to do research in their freshman courses,” Imbruce says.

Gokhan Ersan, assistant professor of art and design, and Kevin Lahoda ’98, adjunct lecturer of art and design, have also created something unique for this course — a smartphone app.

“The app will give students a way to visually navigate the class,” Ersan says. “They can see where glass or ceramics fit in historically but also drill down into what the material itself looks like on an atomic level.”

Moreover, the course’s collaboration with the Corning Museum of Glass will lead to a co-curated exhibit at the Binghamton University Art Museum in 2021.

“The interdisciplinary principles and approaches developed for the course will be drawn together to form the exhibition,” Smart says.

Binghamton’s investment in fostering transdisciplinary work through the formation of the TAEs, along with its commitment to a liberal arts education, has made each of these innovative projects possible. Smart and Imbruce believe that this approach can significantly reposition the arts and humanities as a vital element of higher education.

“Most universities aren’t built for this type of transdisciplinary work,” Imbruce says, because faculty usually only teach classes dedicated to their field. “We really wanted to challenge that structure by having a class that could draw from a variety of disciplines and that incorporated people outside of academia.”

“The world is already transdisciplinary,” Smart says. “Universities just need to catch up.” ■

A \$100,000 grant from the NEH is funding an expansion of the Materials Matter course.



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Molly Singer, left, and Oshila Bopearachchi work behind the scenes at Golden Artists Colors Inc. in New Berlin, N.Y., to explore the properties of acrylic paints.

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