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Engineering, Beauty and a Longing for the Infinite

A recent excursion to Italy made it clear to students and professors alike
that these things are interrelated

By [Margarita A. Mooney](#) on October 22, 2019



A Ducati 1299 Panigale motorcycle being assembled in Italy. Credit: [Getty Images](#)

In July 2019, I embarked upon a six-day excursion across Italy with 14 undergraduate students and three professors from Princeton University. The trip was part of a six-week summer course titled

“Two Millennia of Structural Architecture in Italy.” Given the title, it should come as no surprise that the instructors were professors, not of architecture or history but of civil engineering. But the course, sponsored by Princeton’s Institute for International and Regional Studies Global Seminar Program, was about much more than understanding how buildings were, and are, constructed. Too often, STEM students are understimulated in wonder, beauty, awe—the kind of childlike curiosity and enthusiasm for discovery that can incite great innovations in science and engineering. Studying beauty in the university has too long been relegated to departments of art or music or literature—but Sigrid Adriaenssens, Maria Garlock and Branko Glisic recognized the need to educate engineering students, too, about history, culture, people and art. What was I—someone whose work lies at the intersection of sociology, theology and philosophy—doing on this trip? Our modern world is driven by a view of the person that sees us as essentially driven to dominate others, acquire endless personal gain or develop powerful technological skills. The aesthetic dimension of the human person—our desire for beauty—often seems to get left out of not only business and engineering but also much of the social sciences. Our disciplines present an implicit model of the human person as essentially a social product, a profit-maximizer or a great big machine.

But is that *all* we are?

Humans are born with a desire for beauty, but that desire, like any desire, needs to be nurtured—cultivated like a garden. Any good education must include an education in beauty; likewise, any field of knowledge that is stripped of the beauty of its object, whether that be a machine, a book or a person’s life, will be stripped of its mystery. As made clear in the experiences of famous scientists captured in the book by Marco Bersanelli and Mario Gargantini, *From Galileo to Gell-Mann: The Wonder that Inspired the Greatest Scientists of All Time: In Their Own Words*, studying the natural world sparks awe and wonder.

My training in the social sciences implicitly borrows methods of positivism or empiricism that do not just correspond to the human person in an integral fashion. Social sciences collect empirical data, but they also need and philosophy, theology and a language of beauty, wonder, awe and love. We are creatures who do things, but we are also creatures who contemplate things. We can’t live a flourishing life simply by satisfying our basic needs (even the need for surviving a motorcycle crash). Engineers and other specialists need to work together to build the products that serve our human nature, including our desire for awe and wonder.

One of the reasons universities structure learning across disciplines is that different ways of looking at the world train our minds in different ways: reading a text; proving a theorem in math; closely observing an object in its surrounding; pondering the meaning expressed by a piece of art; and building a bridge all require different types of cognitive skills, which need to be honed, tested and pruned.

And that was why we were in Italy. During the excursion, students learned about Italian architects including designers and icons of design: Brunelleschi, Canova, Ducati, Dainese, Nervi, Michelangelo, Palladio and Pisano. For six days, the students, professors, guides and I were immersed in the beauty of educating ourselves on the genius, risk-taking, and leaps of faith that create amazingly useful products—including motorcycles that dazzle us with their speed; airbags that protect us if we fall; churches that have inspired centuries of worshippers; and tobacco factories that were once abandoned but which are being repurposed for the technology of a new age.

During the many stops in our whirlwind tour of Bologna, Vicenza, Venice and Florence, we studied varied objects with the aid of experts. In Vicenza, for example, the art historian Guido Beltramini, an expert on the architect Andrea Palladio, took us to villas, bridges and a theater Palladio designed. We walked along the shop floor of the Ducati motorcycle factory, then met with Andrea Ferraresi, Ducati’s Design Director. The businessman Federico Minoli, who has been the CEO of Ducati, spent several days with the students, explaining what it takes to bring a great invention to the market.

We also visited the Dainese Archive, and met Lino Dainese, founder of the company and inventor of beautiful, comfortable and very safe motorcycle jackets, boots and even an exploding jacket airbag. Dainese, whose patented inventions have saved hundreds if not thousands of lives, insisted to the students that he's not an engineer or a designer, which are fields he has not formally studied. But he is a lover of beauty and a lover of people. His passion is to save the lives of those so fascinated by the mystery of the infinite they would ride a motorcycle at 350 kilometers an hour, or up a treacherous mountain peak.

He made it clear that technological scientific discoveries are often made by people whose hearts long for the infinite. And along with the others we met, he showed us that the buildings, objects of art and machines we use every day came about through a creative genius that integrates beauty and function. But learning the biography of great inventors further showed the class that no creative genius exists in a vacuum. Even they make mistakes and need help from others.

Trips such as this provide a much-needed opportunity to bring together all the ways our minds work and to learn from each other's observations. Watching professors "geek out" about all the complex mathematics that went into building the structures we visited was a person-to-person way of communicating the joy of scientific innovation.

As Branko Glisic kept pointing out, something can't be beautiful if it doesn't work. A bridge that looks nice and collapses never was beautiful in the first place. Students found beauty not only in perfection, but in an abandoned tobacco factory built by Pier Luigi Nervi in Bologna now being repurposed as a meteorological center. Seeing the millennia of structures being made out of earlier structures from classical, Renaissance and, now, modern architecture inspired wonder in us at human ingenuity that can preserve traditions of beauty while also adapting existing structures to new purposes.

Without educating all forms of knowledge toward mutual coherence, without standing in a tradition of thinking and being, our varied emotions, thoughts, expressions and even the things we create in a laboratory don't add up to anything more than noise. Fleeting sensory pleasures or tools that badly fit the needs of humans don't lead to human flourishing.

Connecting STEM and the liberal arts is crucial for the simple reason that, as one student wrote, "whether created as monuments to God, places to live and entertain, or ways to travel, structures are inevitably built for humans to enjoy."

A liberal arts education is supposed to make us free. Modern education can't just be focused on productivity but must engage with the core questions of truth, beauty and the good across all fields. Universities exist to help the young understand the past, preserve what's good from it, discover new forms of knowledge and know how to apply that knowledge for the human good. Integrating the study of engineering and beauty will not only help students be more creative and take risks; it will help them resist the reduction of the human person to merely an object buffered from the transcendent.

Education in all fields of knowledge—including science and engineering—should be understood as part of educating the universal human longing for the infinite.

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