**Pisa**

Pisa was known as a major maritime power fighting with Genoa, Venice and other city-states for supremacy of the seas around the Italian peninsula. Its apex of power was during the 11th century, so it is not surprising that the city offers some excellent examples of Romanesque architecture. Originally the city was located on the coast, as one might expect of a sea power, but today is located 11 km inland, the result of millennia of erosion due to deforestation of the Arno River watershed (in which Montepulciano lies) and subsequent sedimentation at the mouth of the river.

Pisa is an excellent place to point out the connections of mathematics to other disciplines (art, science, music, economics…), if that is a theme useful in your course. **Fibonacci** (Leonardo Bonacci, c. 1175 – c. 1250) was born and lived in Pisa (his statue located in the Campo dei Miracoli). He is not only known for writing the book that successfully acquainted Europe with Arabic numbering system and modern arithmetic as applied to commerce (advocating it over the clunky Roman numeral system), but also for recognizing the number sequence where every number after the first two is the sum of the two preceding ones (1, 1, 2, 3, 5, 8, 13, . . .). Dividing one number into the next number of the series approaches the golden ratio, important in many great works of art and architecture. The sequence is deeply imbedded in scales of western music (look at a 13 key sequence of an octave on a piano: 8 white keys, 5 black grouped in 2 and 3), and is thought to be utilized in great works by composers such as Mozart and Beethoven. Fibonacci numbers also manifest themselves in nature (e.g. in numbers of petals produced by flowers). In addition, Pisa was the birthplace of Ulisse **Dini**, an important 19th century mathematician/politician who worked on number sequences as well (in the central part of the city is his statue on the street named for him). And most famously, structures in Pisa were useful to **Galileo** in making a giant leap in modern science, describing physical phenomena through mathematical relationships (a way of thinking thought to have been inspired by his music theorist/mathematician father). It is of course in Pisa where Galileo introduced his experimental approach, which, by dropping weights from the Learning Tower, debunked Aristotle’s ideas of falling bodies. The Duomo was where a lamp swinging from the ceiling (now on display in the Camposanto) is said to have informed Galileo’s work on the isochronic property of the pendulum.

The Campo (or Piazza) dei Miracoli (a UNESCO World Heritage Site) is the main attraction in Pisa, consisting of the [Duomo (The Cathedral of Santa Maria Assunta)](https://en.wikipedia.org/wiki/Pisa_Cathedral) with its [Torre prendente di Pisa](https://en.wikipedia.org/wiki/Leaning_Tower_of_Pisa) (the Leaning Tower), [the baptistery](https://en.wikipedia.org/wiki/Pisa_Baptistery), and [Camposanto](https://en.wikipedia.org/wiki/Camposanto_Monumentale) Monumentale (the graveyard). In addition to numerous important pieces of artwork in these structures (including a Cimabue mosaic), the structures themselves provide fine examples Romanesque architecture with Arabic influence (as might be expected from the seafaring ways of Pisa’s inhabitants). I think traditionally classes have spent the day in the Campo dei Miracoli, though this is not a requirement if there are other sites to where you want to take your class. I am told that the Leaning Tower is kind of a bucket list thing, so if you go elsewhere, include the tower or else suffer the protests of your students. Listed below are some other sites in Pisa, though be aware that time is limited on this trip due to the length of the bus ride:

* [Orto Botanico](http://www.atlasobscura.com/places/botanical-garden-of-pisa), Europe’s first university associated bo tanical garden.
* More churches: [Santa Maria della Spina](https://en.wikipedia.org/wiki/Santa_Maria_della_Spina) (housing a thorn said to be from the crown of Christ), [Santo Stefano dei Cavalieri](http://www.tuscanypass.com/tuscany_attractions/13028_church-of-santo-stefano-dei-cavalieri.html), (the façade designed by Giovanni de' Médici), [San Paolo a Ripa d'Arno](http://www.tuscanypass.com/tuscany_attractions/12962_church-of-san-paolo-a-ripa-d-arno.html) (with its Pisan Romanesque façade), as well as [others](http://www.in-italia.com/italy/tuscany/pisa/ten-churches-in-pisa/).
* The palazzi along the Arno including the one where Byron wrote *Don Juan.*
* [Birthplace of Galileo.](http://www.turismo.pisa.it/en/culture/detail/Casa-natale-di-Galileo-Galilei/)
* [Museo di San Matteo](https://en.wikipedia.org/wiki/National_Museum_of_San_Matteo%2C_Pisa) housing artwork for Pisa’s churches.
* [National Museum of Palazzo Reale](http://www.pisaunicaterra.it/en/beyond-the-tower/museum-of-palazzo-reale.html). (€ 5.00)
* [Piazza dei Cavalieri](https://en.wikipedia.org/wiki/Knights%27_Square), the political power center of medieval Pisa
* Three more towers to climb (well, maybe view): the campanile of [San Nicola](https://en.wikipedia.org/wiki/San_Nicola%2C_Pisa) (an octagonal tower designed on mathematical principles laid out by Fibonacci), Torre Guelfa (Pisa was Ghibelline until Florence exerted it influence), and Torre di Santa Maria.
* [Lunch](https://www.lonelyplanet.com/italy/pisa/top-things-to-do/a/poi/360065)

In previous years, faculty felt that Pisa is a long ride relative to the pay out, so we’ll the stop in the town of [Lucca](https://en.wikipedia.org/wiki/Lucca) on the way back. I suspect that many students will plan to leave for their weekend travels from Pisa, so this should be an opportunity for faculty and the few remaining students to have a causal exploration and pleasant [dinner](https://www.tripadvisor.com/Restaurants-g187898-zfp16-Lucca_Province_of_Lucca_Tuscany.html). Be advised, we won’t get back until later in the evening.

**Other Resources:**

* [Street map of Piza](http://www.planetware.com/tourist-attractions-/pisa-i-to-p.htm)
* [Interactive map of Pisa](http://www.turismo.pisa.it/en/culture/)
* [General info on Pisa](http://www.turismo.pisa.it/en/)