

## FOUNDATION FOR EDUCATION

In an effort to inspire young minds and build awareness about different ways to observe the world around us, the Fibonacci Sequence plays a role as part of the visual landscape displayed throughout the McGinley Plaza and outdoor spaces.

Discovery Park, part of the Office of the Vice President for Research, serves as an interdisciplinary research hub for Purdue, building on the University's strong academic disciplines and mission to launch tomorrow's leaders, promote discovery with delivery, and address global challenges.

The primary building blocks known as STEM ...

Science, Technology, Engineering, Mathematics, ... play a vital role in discovery and learning. Purdue is committed to equipping the next generation of leaders with a solid foundation in the STEM disciplines.

## STEM'S IMPACT IN DISCOVERY

Purdue researchers and investigators depend on a strong base in the STEM disciplines in order to tackle projects like:

- » Finding a cure for cancer
- » Sustaining the environment through alternative energy sources
- » Seeking healthcare system solutions
- » Transforming education through teaching and learning research
- » Developing new diagnostic tools for treating diseases
- » Leading innovations in cyber technologies

## ABOUT DISCOVERY PARK

Discovery Park is the heart of large-scale interdisciplinary research and innovation at Purdue. Launched in 2001, Discovery Park has grown into a \$500 million research complex, where more than 1,000 faculty members join with 3,000 students to bring multiple disciplines together for solving the world's most challenging problems.

## ABOUT MCGINLEY PLAZA

Dedicated in spring 2009, the plaza in Discovery Park is named for J. Timothy McGinley, an Indianapolis businessman who served 16 years as chairman of the Purdue Board of Trustees before retiring in July 2009, and his wife Jane.



[www.purdue.edu/dp](http://www.purdue.edu/dp)

For McGinley Plaza and Discovery Park tours, contact:

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**PURDUE**  
UNIVERSITY



# McGinley Plaza

Patterns in Nature Create  
Outdoor Learning Laboratory

- *Providing lessons in science, technology, engineering, and mathematics (STEM)*
- *Rediscovering the Fibonacci Sequence*

# McGinley Plaza

## at Discovery Park

### THE PLAZA

The J. Timothy McGinley Plaza serves as a gathering place in Discovery Park for Purdue visitors, students, and researchers working in interdisciplinary teams to address grand societal challenges. Finding solutions to those challenges requires a strong foundation in science, technology, engineering, and mathematics, also known as the STEM disciplines.

Design elements in the plaza and the 4,000-square-foot outdoor learning space reveal scientific and mathematical patterns and bring to life learning experiences in STEM.

### FOUNTAIN AS A SYMBOL

The Discovery Park fountain, measuring 30 feet long, has already become a Purdue landmark. Historic advances in discovery at Purdue are represented through imagery of agricultural equipment, mathematical equations, chemistry, and astronauts in space. Iconic campus images also are featured — Ross-Ade Stadium, Bell Tower, Purdue Memorial Union, Hovde Hall, Mackey Arena, and Neil Armstrong Hall.

The fountain's design was inspired by the Fibonacci Sequence in the stone dimensions on the water cascade at its base, in the metal armature that supports the glass, and in the glass itself as images spiral across its face.

### FORMULA FOR DESIGN

The Fibonacci Sequence is a numerical sequence that mathematically describes the logarithmic spiral found in many natural elements and marvels — from pine cones, nautilus shells, and sunflower seed heads to artichokes and pineapples, even the fingers on our hands.



### HISTORY OF FIBONACCI SEQUENCE

Actually, the Fibonacci Sequence, or series, originated in ancient India and was used to describe the rhythms in Sanskrit prose.

The famous 13th century Italian mathematician, Leonardo of Pisa, known as Fibonacci, introduced Western European mathematicians to the Fibonacci Sequence through a fictional description of the growth of a population of rabbits in his first book, *Liber Abaci*, issued in 1202.

The book also introduced the Hindu-Arabic numbering system based on the nine digits, decimal point and zero used today, and described new methods of arithmetic using the decimal system, ultimately persuading mathematicians to abandon the Roman numeral system.

Have you ever tried to add and subtract using Roman numerals?

### The Fibonacci Sequence is

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55...

*Do you know what number should come after 55?*

*Can you determine the rule leading to each number in the series?*

### Where

$0 + 1 = 1$ ,  $1 + 1 = 2$ ,  $1 + 2 = 3$ ,  $3 + 5 = 8$ , and  $5 + 8 = 13$

Each succeeding number in the sequence is the sum of the two preceding it.

### Logarithmic Spiral in McGinley Plaza

Observe the:

- » Framework and imagery etched on the fountain
- » Geometric configuration of pathways
- » Mathematical sequences
- » Steps of the fountain's waterfall

### Patterns in Nature

The Fibonacci Sequence also is used to explain patterns found in nature.



Nautilus Shells



Sunflower Seeds



Human Hand

### TAKE THE CHALLENGE!

Now that you have discovered the mathematics and science built into the design of the McGinley Plaza, try to spot other patterns in the world.

*What other natural objects can be described using the Fibonacci Sequence?*

*What other patterns can be revealed in the world around us?*

*Did Leonard da Vinci use a mathematical pattern to paint the Mona Lisa or draw the Vitruvian Man?*

*Are there mathematical patterns used in architecture?*

