

# Art and Mathematics, through the lens of photography

*Institute for Visual Studies Studio Seminar*

*syllabus*

Course Description: This course, offered through JMU's Institute for Visual Studies, will explore the interplay of visual art and mathematics. Artists use mathematics as a tool, for instance to preserve or distort perspective, and as inspiration, as in contemporary work using randomized processes. Mathematicians use visual methods for conjecture and argument, via "picture-proofs," and as a compelling way to communicate mathematical ideas. We will examine the overlap of the two disciplines from multiple perspectives, with varied examples, throughout the semester. Disciplinary interpretations of beauty and rigour form a third, underlying, conversation in the course.

The primary media of the course will be photography and mixed media. Mathematical themes will include perspective, randomness, and algorithms. Students will have the opportunity to work in alternate media on individual projects, and to select the mathematical topic for their semester projects. Students will choose and research a piece of visually relevant mathematics at a level appropriate to their background and enrollment choice (art credit versus math credit).

The class will be half studio art, half mathematics. It is suitable for motivated students with some advanced coursework in either art or math, but not necessarily both.

Class meetings: Mondays and Wednesdays, 10:45-1:15 in IVS classroom, Room 208.

Faculty:

Corinne Diop, Professor, School of Art and Art History, [diopcj@jmu.edu](mailto:diopcj@jmu.edu)

Elizabeth Theta Brown, Associate Professor, Department of Mathematics and Statistics, [brownet@jmu.edu](mailto:brownet@jmu.edu)

Grading: Students' grades will be based completion of course projects at a level of artistic and mathematical sophistication appropriate to their credit option (art or math), and class engagement.

Important dates:

IVS exhibit: Outside the Golden Rectangle (??)  
Catalyst visit from Linda Henderson (tentative) April 8  
Course exhibit opening: April 8

Tentative outline:

Week 1, January 7-9: introduction, photography theory and technique, randomness, hands-on project of stop camera, attempts to simulate a “random” string.

Week 2, January 14-16: randomness in contemporary art work, mathematics of randomness, probabilistic algorithms, (Law of Large Numbers?),

Week 3, January 21-24: dimension in art and math, remarks on dimensions above 3, representations thereof, hands-on projects, begin reading Henderson text.

Possible January trip to/interaction with the Roanoke College Hyperbolic Coral Reef project and exhibit, organized in conjunction with the Institute for Figuring. (Dates of mathematical reef projects are not yet out, but planned to be in January.)

Week 4, January 28-30: guest speaker/colloquium, small project critique

Week 5, February 4-6: more on dimension and Henderson reading, hands-on projects, fractional dimension

Week 6, February 11-13: discuss semester projects, groups, tiling – mathematical introduction, examples, hands-on project for groups

Week 7, February 18-20: colloquium/guest speaker, symmetry groups, hands-on project for symmetry groups

Week 8, February 25-27: critique of semester project proposals, discussion of the Golden Rectangle show, discussion of regrettable art-math projects (see Fields Institute site).

Week 9, March 11-13: studio/research assistance, guest speaker/ colloquium

Week 10, March 18-20: algorithms in art, algorithms in mathematics, examples, hands-on project

Week 11, March 25-27: impossibility results concerning algorithms: the unsolvability of the Halting Problem, impossibility in general in art and in mathematics

Week 12, April 1-3: Turing degrees, studio/research support, photo workshop, exhibit installation

Week 13, April 8-10: exhibit opening, catalyst visit with Linda Henderson

Week 14: class critique, future directions, course wrap

Possible Colloquia:

Laura Taalman – Symmetry, aesthetics, open and recently solved questions in the mathematics of Sudoku (confirmed)

Katie Quertermous – the IFF hyperbolic coral reef, Roanoke College portion

Edwin O'Shea - Visual argument in mathematics