Foreword

Every college has its legendary professors.

At Yale, one of them is Michael Frame.

Students have been flocking to his course on fractal geometry for the past twenty years. Its description in the course catalog hints at what makes it (and him) so extraordinary:

MATH 190a, Fractal Geometry Michael Frame

A visual introduction to the geometry of fractals and the dynamics of chaos, accessible to students not majoring in science.

Study of mathematical patterns repeating on many levels and expressions of these patterns in nature, art, music, and literature.

Doesn't that sound appealing? "A visual introduction" – perfect for intuitive, right-brained types. "Accessible to students not majoring in science" – thank you! Here's a teacher who believes that everyone can fall in love with math if it's presented with empathy and humor and clarity and context. And speaking of context, who can resist wanting to learn how "patterns repeating on many levels" express themselves in "nature, art, music, and literature"?

This book is the distillation of Michael Frame's celebrated course. You're about to see why so many of his students thank him for being the best teacher they ever had.

Earlier today I read a profile of Michael Frame written by his coauthor on this book, Amelia Urry. It moved me to laughter and tears. And it made me want to meet both of them. Titled "Curious Geometries," it was published in the *Yale Daily News Magazine* in 2011 and is available online at

<http://yaledailynews.com/magazine/2011/11/08/curious-geometries/>

With great lyricism and poignance, Amelia Urry tells the story of how Michael Frame came to be at Yale and describes his decades-long friendship and collaboration with Benoit Mandelbrot, the genius who made fractals a household word. The voices of all three of them – Frame, Urry, and Mandelbrot – sing through the book before you, and they harmonize perfectly.

With so much hand wringing these days about STEM and innnumeracy and the importance of math for our nation's global competitiveness, a book like *Fractal Worlds* could be just what's needed. It portrays math as math lovers know it: a beautiful garden, a place of curiosity and delight, a tribute to human creativity and the wonders of nature.

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