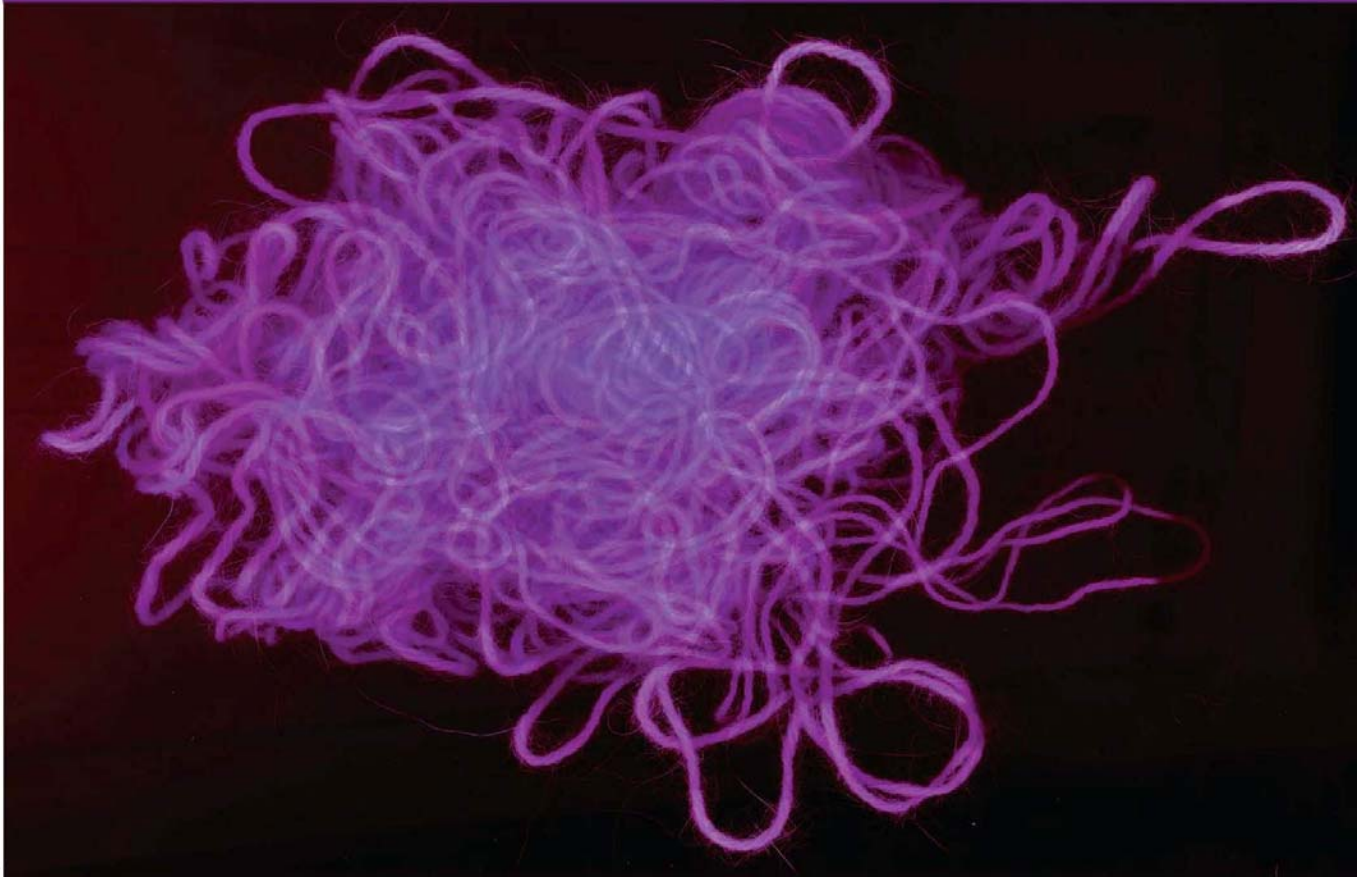


YARN THEORY: KNITTING, CROCHET, MATH AND SCIENCE



Exhibition Catalog
April 25- May 17 2009

PS122
GALLERY

Yarn Theory presents a sampler of some of the NYC area's most interesting artists, who test and push what can be done with the medium. The impetus for the show was triggered as a response to former Harvard president (now director of the White House's National Economic Council for President Obama) Larry Summers' assertion that women are less mentally able to do math and science, which, he reasoned, explains why there are fewer women working professionally in that arena. We counteract that assertion; this is not a plausible explanation of why the professional field is not level. We believe there are other, more sociological forces responsible for that inequality. We can show that, far from being repelled by such subjects, women practice them for fun, for recreation, and for artistic satisfaction, and are increasingly focused on it as a pure topic of interest. There is a vast back and forth between the hard sciences and soft sculpture, by both artists and practicing mathematicians, which yields surprising and visually stunning range of possibilities. Many of the artists in *Yarn Theory* are in fact, professional scientists and mathematicians, modeling their forms through the flexible and very visual means of yarn. My goal with curating *Yarn Theory* has been to show how visual, exciting and absorbing the logics of the sciences are, and I sincerely hope that visitors seeing this show will be inspired to pursue their own takes on what we present.

This exhibit is at the tip of a very large iceberg. A bigger portion can be glimpsed on the internet, at sites such as **Ravelry**, **Knitty** and **Etsy**, yet this movement is impossible to behold in its entirety. There are vast numbers of people out there knitting, crocheting, and doing yarn-work in a plethora of styles, intentions, and arenas. We have chosen to limit ourselves, in the face this enormity: for *Yarn Theory* there are no garments, no socks, blankets, or other wearables, no matter how ingenious. We have focused instead on the rich field of hand-worked sculptural objects, and their relation to math and science. This too, is too large a topical scope for our one gallery: There is more out there, much, much more....

To investigate this further, we suggest you look on our blog at: ps122gallery.wordpress.com, click on any number of the provided links and jump down the rabbit hole.

Daina Taimina, who actually invented the method of "hyperbolic crochet" so popular now, models topologies which echo the forms of sea and plant life. This play between the abstract and the actual is poignant, a reminder of variety and commonality in organic structures. Dr. Taimina's work began as she saw William Thurston's paper models of hyperbolic forms, and she realized that crochet would really work intrinsically better to model the complex bends, folds, and curling inherent in the structures she was working with. Her forms are as notable for their aesthetic variety and wonderment as for their theoretical clarity.

Also paper-model inspired are origami master Miyuki Kawamura's crocheted platonic solids. These are strikingly clear models of geometric forms and an inventive use of her paper folding skills, applied to the very different medium of yarn.

Sarah-Marie Belcastro has done perhaps more than anyone to bring the mathematical possibilities of knitting to the fore. A professional mathematician working in the field of topological graph theory, she found knitting a natural way to construct shapes and surfaces that made her ideas easier for her students to follow. Her tori, Klein bottles and non-orientable surfaces show clearly and wonderfully what is so difficult to verbally explain. This project resulted in the book she co-edited with fellow knitter/mathematician Carolyn Yackel: *Making Mathematics With Needlework*. This marvelous and accessible book is a must for anyone interested in the sculptural possibilities of knit work. We eagerly await its companion volume.

Artist Nancy Cohen in conjunction with her mother Rita, and son Anshel, takes ideas from the same geometric realm as Dr. Belcastro, transforming them into a highly personal family story through the use of recycled yarns and intergenerational collaborative work. Her piece, made specifically for this exhibit, fuses topological geometry with the intimate and biological. Also biological, but on a more physiological level, are the works of artists Emily Barletta and Christine Domanic. Both artists deal with images of the interior of the body and its basic structures, with very different results. New photo-imaging technologies have brought us closer to our basic make-up. Barletta's work offers a kind of hand-made extreme close up of our cell structures, our blood, the physical components which cluster together make up our bodies. Domanic's work comments on the externalization of our internal organs, and references the culture of laboratories, cloning labs and curiosity cabinets with her collection of stuffed bottles and tubes. The didactic urge is taken up by Amanda Gale whose stop-motion animation film *The Journey Of The Nucleotides* turns educational filmmaking on it's fuzzy head. This charming and personal take on the genre offers a playful glimpse into our own internal micro-makeup.

While yarn-work is often perceived here in the United States as women's work, many men do crochet and knit, in some parts of the world, traditionally so. Daniel Yuhas is a splendid example of the male new-wave in knitting. His offering for *Yarn Theory* is a Fibonacci-sequence constructed sculpture, *I Have Been Circling for Thousands of Years*, which is being shown for the first time. I am excited to be able to include as well, Dr. Ted Ashton's marvelous lace fractals as an example of the interface possible between the delicacy of the hand-crafted and a rigorous mathematical theory. A professional mathematician, Ted has ventured into tatting lace to show beautifully and elegantly the structural logic of fractals.

Another innovative example of contemporary lace work is biologist and medical doctor Margaret Ooman's stones covered in crochet, which offer a kind of wry solution to the buffeting effects of erosion and a make tender meditation on the beauty inherent in natural structures. Her works echo snow flakes, sea urchins, sunflowers, the vast and the tiny, and all by using the minimal materials of vintage string and some beach pebbles.

Kate Fenker's *Blue Dew Drop* elegantly takes the ripples and a movement contained in a tiny single water droplet hitting the ground, and captures it into a knitted floor sculpture with astonishing effectiveness.

On a vaster geological scale, Gail Rothschild's drawings are no less keenly observed. An avid rock climber she scribes works which align knitted fabrics seen close up with monumental rock formations. The results are epic and vast drawings presented with economic and modest means.

In addition to the rich output of people working individually, yarn-work lends itself beautifully to collaborative efforts and has been harnessed to create a sense of community, to voice political and social ideas to foment change, and to transform traditional notions of 'craft-work' into something contemporary and relevant. In conjunction with the exhibition *Yarn Theory*, there is an exciting series of special events. Under the direction of one of the founders of **PS122 Gallery**, artist Karen Eubel, there is an exterior guerilla knitting project underway to alter the exterior of the building. Her *9th Street Fence* project will include knitters and crocheters from throughout the region. There is also a musical performance by knitter-singer Lisa Daehlin, a mathematics workshop for children led by Daina Taimina, as well as gallery workshops and informal gallery knit-ins, all with the idea of bringing the community into our gallery, to participate and to try doing it themselves.

We are very lucky to be able to present, in its New York City premiere, artist Robyn Love's *Knitted Mile* in the hallway space. Her installation wittily segues the exterior projects and the outside city with the interior world of the exhibition.

For *Yarn Theory* and its satellite programs we have tried to present the best of what is locally available right now in terms of knitting and crochet. All of the work here is original to its makers and presents ideas and images that are profound, original, elegant, funny and thought-provoking. I am proud of this show and its participants, and I hope that it encourages the people who see it to explore further.

There is more out there: just go find it.

Martha Lewis

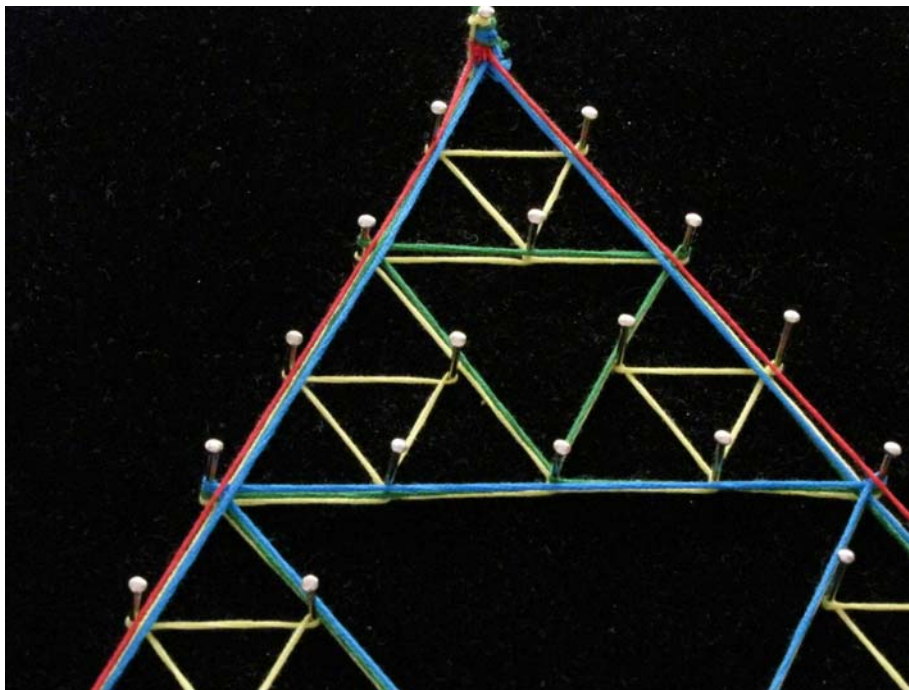
Ted Ashton:

Ted Ashton has a Ph.D. in Math, a B.S.E. in Electrical Engineering and a decade of professional programming experience. He likes to mix those fields together in various ways to see what might result. He is an avid amateur cellist and a lover of chamber music. In his spare time, he likes to solve *griddlers* and *blacksmith* puzzles and is often seen tatting in meetings and lectures.

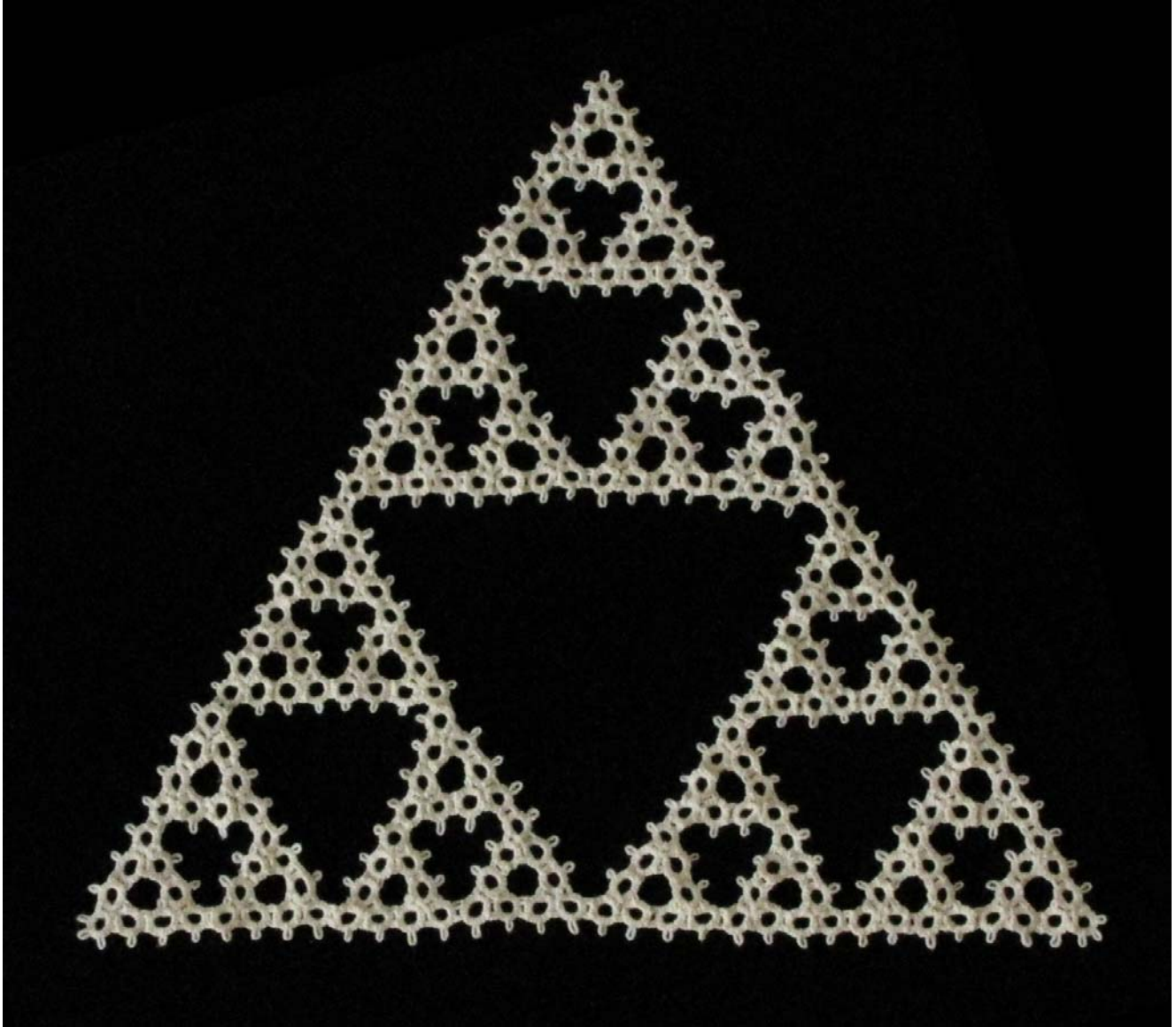


Ted learned to tat from his first girlfriend and has long enjoyed making beautiful things. At the **2005 Joint Math Meetings** he attended some of the fiber arts sessions organized by Sarah-Marie Belcastro and Carolyn Yackel. There he was inspired by the crocheted Sierpinski Triangles of Jake Wildstrom and set out to tat one of his own. Since his wife has a fondness for triangles, this seemed a good project, so the triangle grew through a year or two of graduate-level math seminars.

But it wasn't until he was preparing for a talk at the **2009 Joint Math Meetings** that Ted realized how many different ways this particular fractal can be created.



The string work (above) shows how the triangle can be created by tracing a complicated path with a single line. Each new color follows the next level of detail in the final triangle.



The tatted triangle (above) demonstrates that the Sierpinski Triangle can be created by taking a small shape (here, a circle), forming several into a triangle, then making three copies of that triangle into a larger triangle and so on.

Emily Barletta:

Emily Barletta was born in State College, Pennsylvania in 1981. She studied in Baltimore Maryland and received her Bachelor of Fine Arts with a focus in Fibers in 2003 from The Maryland Institute College of Art. After graduating she moved to Brooklyn, New York, where she currently maintains her studio practice. She had her first solo exhibition in Philadelphia at **Art Star Gallery** in 2007 and she has exhibited in many group exhibitions over the past 5 years.



"Crocheting and embroidering has provided a meditative pace to creating work that is soothing to make and explores the idea of repetition and time. Each object and artwork is a physical container that counts and records the passage of time while it was being made."

The thoughts and emotions experienced during this time are funneled through the preoccupation with inventing imaginary forms of flesh, blood, muscles, cells, organs, molds, diseases, plants, and topography. These ideas grow into structures instilled with this specific memory and time."





See more of Emily's work at:
www.emily-b.net

Sarah-Marie Belcastro

Sarah-Marie Belcastro earned her Ph.D. in mathematics at the University of Michigan and graduated from Haverford College with degrees in mathematics and astronomy. She has taught much of the undergraduate mathematics curriculum, using active and collaborative learning techniques, at three small liberal arts colleges and two comprehensive universities. She has also developed several courses of her own, at both the general education and upper levels. Her research areas have included topological graph theory, the mathematics of paper folding, algebraic geometry, feminist philosophy of science, mathematics in dance, knot theory, recreational mathematics, and of course the mathematics of knitting. Sarah-Marie co-edited the book **Making Mathematics with Needlework: ten papers and ten projects** with Carolyn Yackel, and the pair are currently at work on a companion volume. Both books are part of their efforts to grow and inspire a mathematical community of fiber artists, to promote research in mathematics and fiber arts to the mathematics community, and to promote interesting mathematical aspects of fiber arts to the crafting community.



In this exhibit are shown some of Sarah-Marie's knitted topological surfaces. There are infinitely many different topological surfaces, classified by the number of holes and/or number of twists each exhibits. Using a topological model of knitting, Sarah-Marie proved that any topological surface can be knit in accordance with the model. Additionally, Sarah-Marie developed techniques to knit topological surfaces so that their topology is highlighted and their geometry downplayed, but also so that they are mathematically accurate (as much as possible when creating a continuous object with a discretized process) and use but a single strand of unbroken (topological) yarn. The details, both mathematical and aesthetic, are presented in the paper *Every Topological Surface Can Be Knit: A Proof*, to appear in the *Journal of Mathematics and the Arts*.



There is nothing particularly special about the choice of fiber for these pieces; wool works really well for knitting. Sarah-Marie regularly creates her work from single balls of closeout yarn she is drawn to at WEBS (yarn.com for those not fortunate enough to live near its glory). The reason for using single balls is that it doesn't take much



yarn to make a small mathematical object and Sarah-Marie is a s-l-o-w knitter so it's necessary to make small objects if they're ever to be finished.

There are two pieces in this exhibit that used yarn chosen to illustrate concepts: The non-orientable surface of genus 5 can be expressed as the connected sum of five projective planes.

Here, each projective plane is done in a different Color or fisherman-weight wool from **Beaverslide Dry Goods**. (The yarn was left over from a sampler pack used to make a large, soft, comfy, diagonally striped sweater.)



The orientable series was an experiment to see how many different surfaces could be made from a single variegated skein of Uruguayan yarn (from eBay seller southwool). There is a matching series of non-orientable surfaces from a coordinating skein of yarn.

For more about Sarah-Marie Belcastro see: www.toroidalsnark.net .

Nancy Cohen, Rita Cohen,
& Anshel Schaffer-Cohen:



Nancy Cohen was born in Queens, NY and lives in Jersey City, NJ. She has a BFA from Rochester Institute of Technology (1981) and an MFA from Columbia University (1984). Her current installation *Perspectives on Salinity: River From Within* is currently on view at the Katonah Museum. She also has a large installation included in *Global Warning: Artists and Climate Change* at Wesleyan University. Her sculpture has been included in recent group exhibitions at **Spanierman Modern Gallery**, **Von Lintel Gallery** and **Accola Contemporary** in NYC.

Rita Cohen was born in the Bronx, NY and lives in New Rochelle, NY. She studied fashion design at Parsons School of Design and has been making paintings and knitting sweaters for many years. For the last 14 years she has been exhibiting her paintings in various venues around Westchester County including the **Hammond Museum**, the **Newington - Copsey Foundation Gallery** and the **Village Gallery** of Katonah.

Anshel Schaffer-Cohen was born and lives in Jersey City, NJ. He is currently a 10th grader at the Hudson School in Hoboken, NJ. His interests include mathematics and sewing. This is their first collaborative sculpture.





Heptology is collaboration between three generations and the communal interests of our family. We are a painter/knitter, sculptor and student of mathematics. This project bridges shared interests in art, craft, movement, color and mathematical systems. Our piece is based on the branch of mathematics called Topology. For our purposes it involves designing a graph that allows a three dimensional form to be covered in 7 colors where all 7 colors are used only once and all touch each other. We have used this graph to develop a series of torus forms – of knitted yarn, crocheted wire and sewn cloth – these take divergent paths from a beginning mapping diagram –uniting back together into an overall sculptural form.

www.nancymcohen.com

Christine Domanic:

Christine Domanic was born in New Jersey in 1978 and began crocheting at the age of 17. Starting out as an addictive hobby to make gifts for friends and family, crocheting later developed into a method of creating sculptural works of art when she took an Introduction to Fibers class while studying Crafts at the University of the Arts in Philadelphia, PA. There, Christine received a B.F.A. degree in Crafts with a focus in Fibers and Mixed Media as well as Ceramics in 2007.



Before college, Christine spent seven years working as a web programmer and designer. She currently resides in Carroll Gardens in Brooklyn, NY and works in the Merchandising department at **Etsy.com** where she enjoys helping crafters promote their businesses. She also helps run the website's daily email newsletter and is a contributing writer for **Etsy's** blog where she has her own weekly home decorating column.

Christine's current body of work, *Unite 1-8* consists of a series of organic crocheted forms that are accumulated from many small individual units.



The basis of her forms is influenced by cellular theory and the microscopic structures of living organisms. By following the theories that make up all units of life, the sculptures begin to mimic human organs, bone, plants and coral

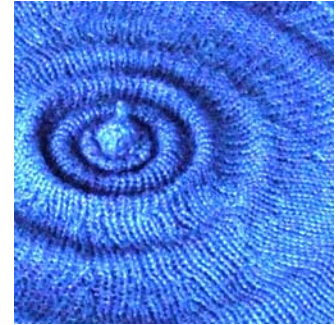
During assembly, she allows each form to grow organically, which leads to a structure with distinct differences from the others created before it. By placing her forms within tubes, vials and bottles, she seeks to highlight the differences that occur naturally in organisms that all share the same theory that cells are the fundamental functional and structural unit of life.



www.JackRabbit.etsy.com

Kate Fenker

Kate received her BFA in 1987 from Oregon State University and was awarded her MFA in 1990, from the San Francisco Art Institute. She currently lives and works in Portland, Oregon.



"Over the past 2 decades, my creative approach has oscillated between introspective concoctions of the mind and observational/learning-based projects. In my most recent work I have exercised both approaches at once, as much as possible, combining generative methodologies with intuition and intentionality.

My early work, semi-abstract paintings and mixed-media sculpture, evoked micro/macro imaginary vistas, interspersed with studies from life and still-life. In San Francisco, in the 1990's, I began to parlay my affinity for otherworldly bedazzlement into sequin-encrusted objects and musical theater. From 1990-1998, I performed with the glam/pop/musical comedy group **Enrique**, concurrently generating obsessive, glittery, curiously anti-Pop Art. In 1998 I relocated to New York, and began doing a great deal of work in the service of fashion and entertainment/advertising. My personal work began evolving in contrast, while simultaneously absorbing every skill, technique, and scrap of material I gained thereby. I developed a love for science and math, the mental discipline and the combination of observation and abstraction; this began informing my art-making approach in a compelling way. In 2008 I relocated to Portland, Oregon, where I am currently expanding my material investigations.

Why knitting?

Well, I was in the process of knitting fashion accessories in New York just as I was beginning to become somewhat obsessed with books on natural science. For the first time, I learned about abstract structures useful in understanding nature, such as the Fibonacci numbers and fractals. This inspired me to dig back in to as much geometry as I could process. Knitting avails itself very directly to the interpretation of numerical patterns and sequences, and I think my enjoyment of the medium makes it easier to embark on unfamiliar journeys. The structure of shapes becomes a palpable experience through generating them in knitting, by how many stitches are added at what intervals- a feeling for constancy or acceleration of expansion. Determining the pattern necessary for a specific form to be knitted proves fascinating!

As the executor, my experience is quite different from the viewer. I hope that the final objects, showing the visible part of the process of their creation, convey some of the feeling of mystery inside simplicity that I experience.

Blue Dewdrop is a combination of flat, concentric, knitting in the round with interruptions at intervals by several rows of knitting with no increases, to create little wave rings. I used

the Fibonacci sequence to determine the wave intervals. I don't think Fibonacci numbers relate to water-drop wave patterns in real life, but I love the weirdly living feeling the pattern gives to inanimate objects. The halo of spreading blue dye provides a visual "etc.," as if the wave circles could go on and on...."



A reminder that all that is coheres and crystallizes in a living liquid.

The model lays flat and exposes her waves.

She ripples and bleeds at the edges to the tune of a Fibonacci frequency.

1-1-2-3-5-8-13-21-34-55-89-...etc.

She disturbs the primordial surface like a dollop of code, like all organic forms disrupt the nothing, each achieving complexity to a similar rhythm.

Her slow dissolving radius suggests a wet ellipsis.

This point of elegant impact need never stop rippling.

Its blue echoes go on forever in every direction.

BLUE DEWDROP ----Orji Walflauer

www.katefenker.com

Amanda Gale:

'I have always been interested in understanding the nature of things from an interdisciplinary, philosophical perspective, and how these interpretations can be brought to life visually. As children, we are taught to understand how things function in the world, and there is often a fight between reality and imagination as we struggle to leave whimsical notions behind in exchange for empirical, rational facts. This conflict is often suppressed as we mature, but it rarely goes away. For many people, art simply represents the pursuit of rational beauty – objects whose only function is to please the eye or decorate a room. I believe that the value of ideas does not have to end in beauty or practicality. For me, there is no dichotomy between art and the real world, with all its imbedded contradictions and synchrony. Art should pull from, and envelop, multiple disciplines. What drives me to make art is the value it places on ideas and experimentation, the space it creates for us, so we can consider the world from alternate perspectives



Many of the techniques I use in my work, like sewing and knitting, are incremental and additive activities: stitch by stitch, row by row, part by part. My work is therefore often pieced together, one idea on top of another. In a world ruled by technology and accessibility, everything is neat, shiny, well packaged and tightly communicated. My work takes a step back from that, relating to the world with the tedious process of doing things by hand, experimenting with and learning the physical limitations of a material, enabling a discourse on reality and imagination.



Journey of the Nucleotides is a stop-motion animation using yarn to depict DNA translation and transcription. DNA processes can seem minute and insignificant in our daily lives, yet these microscopic activities are the building blocks of all life on earth, therefore I think it is important to show just how lively and exciting our microscopic lives really are. Learning about DNA in classrooms and in textbooks can make the process seem flat and



uninteresting. There are wonderful computer animations that depict DNA processes, but for me, these animations are almost too perfect, too cold and robotic to be biological. The microscopic processes of all organisms are in a constant state of activity and movement, but for many of us, this microscopic world can seem distant and alien, which shouldn't be the case for something that is part of us. I wanted to find a way to bring DNA to life in a relatable and playful manner, to create a DNA theater with characters that I could control and direct with my own hands. Being an obsessive knitter and crocheter, I saw a connection between the structure of DNA, which is arranged in intertwined strands of polynucleotide chains, and the structure of knitted and crocheted fabrics, which is created by chains and stitches of intertwined yarn. When wearing a piece of clothing, we often don't think about the thousands of stitches that were actively made one by one in order to build the fabric. By making this stop-motion animation, I was able to directly involve myself in, and bring movement to, a process that is actually happening inside of us all the time. Although we cannot see it or feel it, this process is one of the imperative elements of our existence.

See more of Amanda's work at:
<http://gallery.me.com/redyuck>

Martha Lewis:

Martha Lewis currently lives in the USA and Europe. She received her B.F.A from the Cooper Union and her M.F.A from Yale University. Lewis' Installations, drawings and paintings revolve around her interest in how we diagram time, space and quantity. Her work often involves imaginary inventions and invokes the technological. She has taught drawing through the college seminar program at Yale University, and at Columbia University.



Current projects include *Glossary & Index* which jams together the history of the book and the history of the computer into an outdated computer manual, for an exhibition of artist's books in Oxford, UK. Martha is also currently collaborating on an online graphic novel with award-winning sci-fi author Chris Moriarty.



Lewis' work is in the collection of Nuffield College Oxford, and in Chapman University, in Orange, California where it is on permanent display in the library, as well as in private collections in the U.S.A and Europe. Her work can be found in the Flatfile at **Pierogi 2000** in Brooklyn, NY, and the Flat file at **Artspace**, New Haven, CT.

"I started knitting two years ago after seeing Kaffe Fassett's amazing patterned creations. Initially I thought I would focus on color and texture, but soon became involved with techniques for shaping and sculpting my knitted garments and objects.

While still smitten with the color and textural qualities of yarn, I increasingly find myself spending more time attempting to construct geometric shapes with it. Although I am fatally innumerate, I seem to be inextricably and inevitably drawn to the subjects of math and science.

For *Yarn Theory* I have constructed an installation *Mysterium Cosmographicum Falsigraphia* based on Johannes Kepler's model of the solar system based on platonic solids. This model was laid out in his book from 1600, the *Mysterium Cosmographicum*. He believed he had found God's geometrical plan for the universe. His combination of reasoning, hard science, and mysticism intrigued me- the parts that he got wrong as much as what he got right.



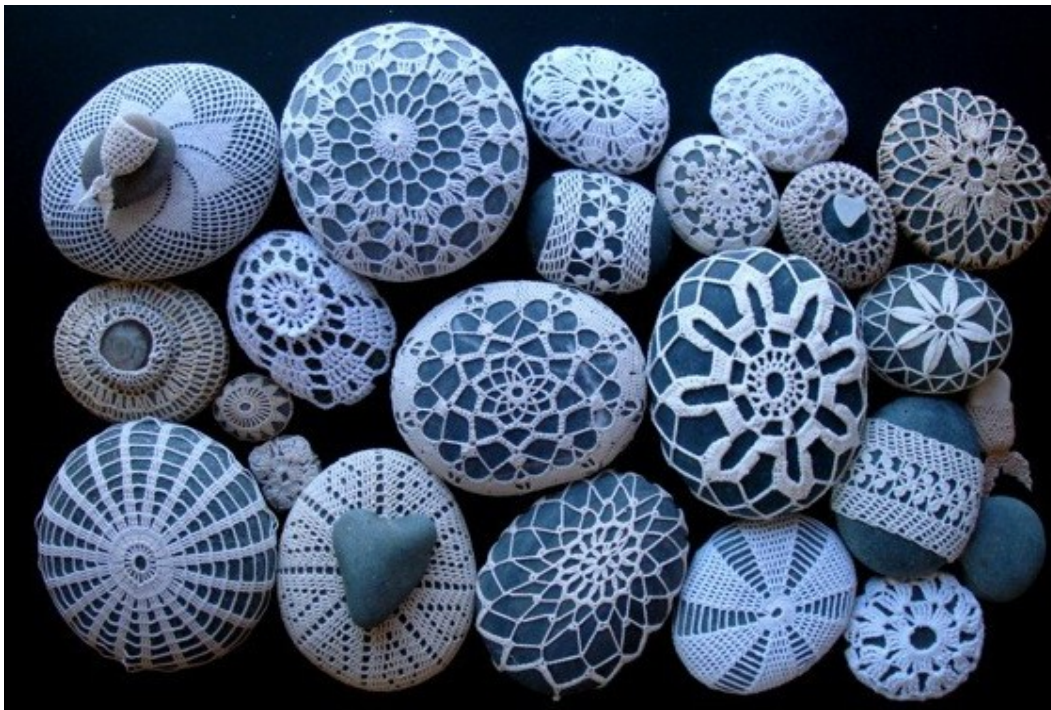
Falsigraphia is the medieval term for the then-rampant genre of "false diagrams". "False model" might be a more accurate description of my installation: it is mistaken beliefs, misjudged imagery, and inaccurate lines of reasoning that attract me as much as correct observations, rigorous logic, and timeless clear-sightedness. The process of discovery itself is bound to be full of errors, and erring is a profoundly human attribute. Raveling and unraveling the mysteries of our universe, and the pitfalls inherent in this process are the impetus behind this piece."

Margaret Oomen:

"Study nature, love nature, stay close to nature, it will never fail you." -Frank Lloyd Wright.



"Nature energizes, inspires and provides me with almost all of my creative materials. Currently I am using stones that have been made smooth by the constant energetic forces of nature. I have collected them during my travels and from the kind donations of wonderful people all over the world. I feel the ocean and sea stones connect us in ways difficult for us to fathom. I cover these stones using only repurposed vintage threads worked with vintage crochet hooks. I like the idea that these materials were forming lace patterns long before I used them in my own two hands to cover the stones. The crochet patterns are almost always inspired by things I have observed in nature: lichen, leaves, webs, frost patterns, and snowflakes, to name a few. Fractal patterns, Fibonacci, and other mathematical sequences are more obvious with some of the crocheted stones than in others. Most of my patterns are made up as I crochet along using the color, texture, and shape of the stone to guide me."



Margaret Oomen, a Canadian rural physician and textile artist, has been a gatherer and maker of things for as far back as she can remember. Aside from a spinning and printmaking class, she is completely self-taught. She draws her inspiration from her treasure-hunting family especially her father, a mathematician and electrical engineer, her own scientific (biochemistry and synthetic organic chemistry) and medical backgrounds, and her great respect and love of the natural world.



Her work has been featured in *Country Living Magazine*, *Design*Sponge*, *Apartment Therapy*, *Elle Décor SA*, *Glam.com*, *ReadyMade Blog*, *Whip Up*, *Craftzine.com Blog*, *Softies Central*, and *Plush You*. She lives in southern Ontario with her husband, four children, three cats, and a snail.

Her work can be found at:

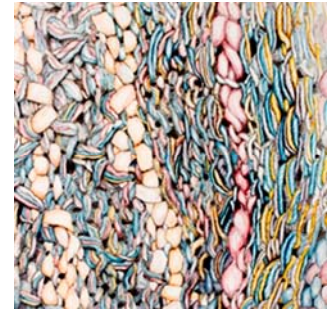
www.resurrectionfern.typepad.com

www.knitalatte.etsy.com

www.flickr.com/photos/12967142@N05

Gail Rothschild:

As a child, Gail Rothschild's two passions were making pictures and climbing. Her interest in materials, structure and the natural world started early, gardening with her mother and drawing with her father, a sculptor, at the American Museum of Natural History.



At Yale she painted, hung around the architecture school, and led the Bulldogs to their first Ivy League Gymnastics Championship. After college, Rothschild accepted sculpture and installation commissions from museums and colleges around the country. Each site-specific installation was an inquiry into the local history of a particular place and usually involved collaboration with a community, suiting the artist's strong need to interact politically and socially. But they were also physically arduous; athletic feats of digging, lifting, carving and welding. In 2000, Rothschild returned to climbing and painting. She completed difficult routes on far-flung cliffs while, back in the studio, she began the *Knitted Field Topology series*.



"Maybe I should mention up front:
I don't knit.

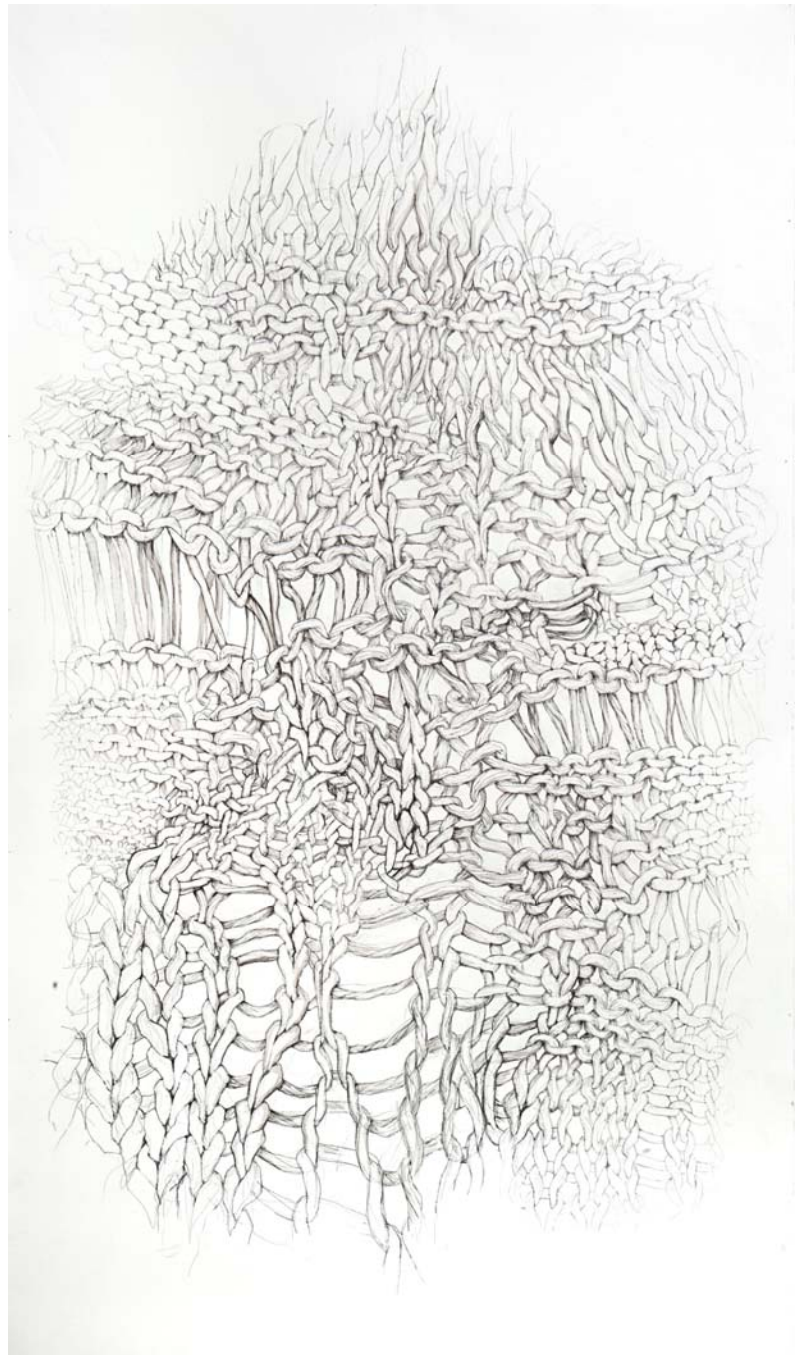
So, why the knitted fields?

During the peripatetic installation years, I had, out of necessity, destroyed nearly everything I made. I couldn't afford to transport or store the work. I began to think about Penelope, wife of Odysseus, who wove during the day and then destroyed her own artistic labors at night in an attempt to keep her suitors at bay. This image of an artist making and then un-making her own work took on profound significance for me. The simple grid of weaving led me, seamlessly, to explore the complex organic structure of knitting.

Isle of Skye V is based on an actual piece of art-knitting by Lorry Marshall that I discovered while in Edinburgh, Scotland for a climbing World Cup. The complexity of the hand-spun yarn and intricate stitches went far beyond my powers of invention. I chose the media of scientific illustration - fine-point

pencil and layers of watercolor wash - because of their potential for clinical description. I wanted to look analytically and microscopically at the structural fibers. *Isle of Skye V* is a dissection. Making sense of the structure was making the painting. I followed the yarns in and out, like viscera. The body as landscape with all its geological strata. The vertical ribbon of stitched silk became, for me, a curved spine. A potent image for an athlete who struggles with the physical asymmetries of scoliosis.

As a rock climber, my experience of the physical world is muscular and tactile. My life depends on my rope and the knot I tie in it. *Webmaster* takes the knitted/knotted fields into a geological scale. Working the graphite and charcoal deep into the paper, I carve out apertures like finger holds. The field of stitches cannot help but grow organically. The negative spaces form hexagonal cells like honeycombs, a ubiquitous form in nature. The final piece is the aggregation and accretion of these individual cellular units. Interlocking loops repeat in a potentially infinite series. Each stitch takes on its own iconography. The horizontal waves of the purl stitch and the ascendant and, yes, vaginal image of the knit stitch repeat, flip, and transform. Like *Isle of Skye V*, *Webmaster* is both body and landscape but on a macro and muscular level."

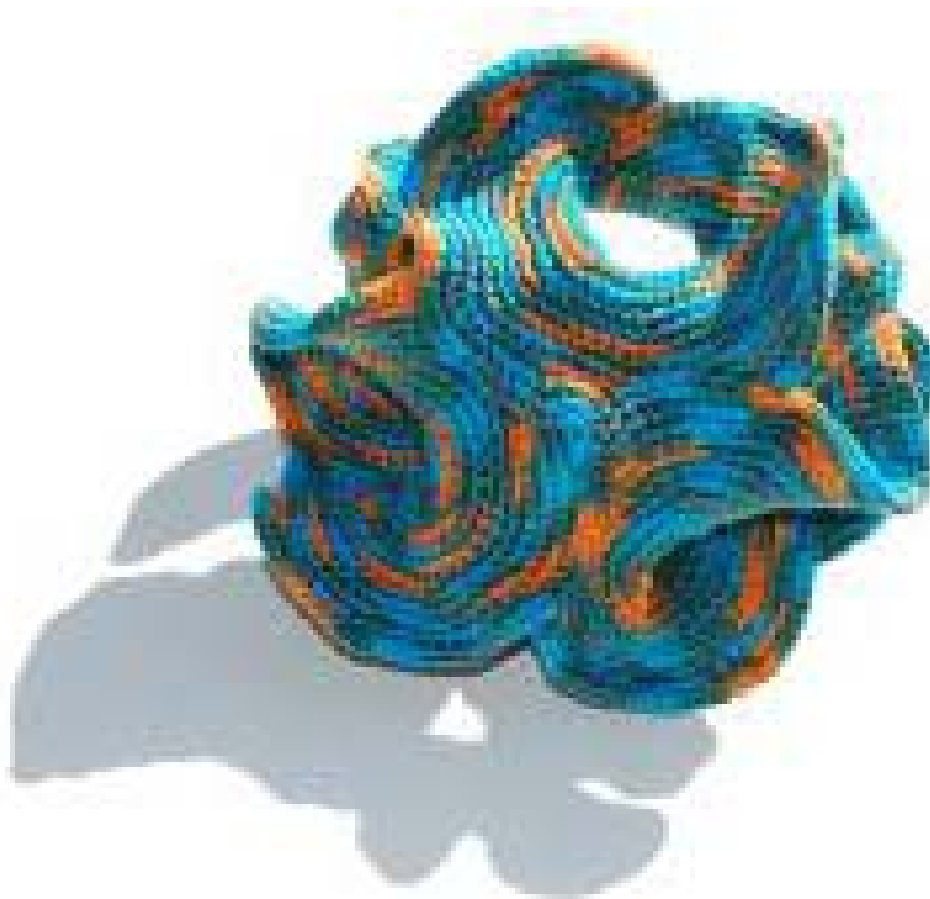


Daina Taimina:



Daina Taimina was born in Riga, Latvia, where she received her formal education, including completing a PhD in mathematics in 1990, for work in Theoretical Computer Science. For 20 years she taught mathematics courses at the University of Latvia, before becoming adjunct associate professor of mathematics at Cornell University. She crocheted her first hyperbolic plane for a non-Euclidean geometry class in 1997. Since then has crocheted more than hundred more, turning geometric models into art pieces.

Daina has given many public lectures and talks, and has participated in art shows in the USA, Belgium, Latvia, Italy and the UK. She is the author of several books on mathematics. The most recent book geared for the general audience is about exploring hyperbolic geometry through crochet: *Crocheting Adventures with Hyperbolic Planes*, published by AK Peters, 2009. Her idea about crocheting hyperbolic planes was picked up by *The Institute For Figuring* which they turned into a worldwide project *The Hyperbolic Crochet Coral Reef*, which now has involved many hundreds of crocheters from around the world.



Taimina's work has been featured on NPR, and on TV's *Science Central*, and in numerous print articles including *Cabinet Discover*, *The New York Times*, *The London Times*, *The Christian Science Monitor*, *FiberArts*, and *American Craft*, to name a few.



"In this exhibit I am presenting a series of new *Geometric Manifolds*. While each visually looks different, they are all in fact the same, in the sense that they all share the same geometry – hyperbolic geometry. If we have a piece of paper, we can roll it into cone or cylinder but those are the only possible transformations that will not deform the plane's geometric structure
–this is Euclidean geometry.

If we start with the hyperbolic plane, this "shaping process" is much more interesting because we have many possibilities to create new shapes – they will all have the same geometric structure but in this case it will be non-Euclidean or hyperbolic geometry. *Geometric Manifolds* come to us through many different routes whether it is nature, or mathematics, science. To understand the manifold one must "see" the pattern, to recognize the structure which will "fit" to the manifold.

I learned this tactile way of exploration of hyperbolic plane from William Thurston's idea of the paper model of the hyperbolic plane. I developed the way to crochet it and that made the model more flexible. My works in this exhibit all have the same pattern that has then taken different forms. Isn't that the same as in our lives – we are following certain patterns but not always recognizing that they are the same? And it is not always clear to us whether the same pattern will lead us to the success or to the failure. I am very fascinated with creating these pieces because results most of the time are surprise for me myself. Crocheting every new piece is like a geometric experiment. "

www.math.cornell.edu/~dtaimina/

Miyuki Kawamura:

Miyuki is a major figure in the world of origami. Her masterful designs have been shown worldwide, and she is author of several books on the subject including:
Polyhedron Origami for beginners.



Miyuki's crocheted platonic solids, shown here in the exhibition strongly show her paper-folding expertise. Miyuki lives and works in Japan.



More of her work can be seen at:

cid-d6ce6f6f217463c3.skydrive.live.com/browse.aspx/MIYUKI%20KAWAMURA?ct=photos

Daniel Yuhas:

"I find natural spirals totally fascinating. The same form can describe a cyclone, the shape of our galaxy, the nerves inside our eyes, a seashell, the path of a hawk to its prey, or the path of a moth to a candle. Knitting a spiral form is a way of making that design by hand, simply, one stitch at a time, and watching it grow with each turn."



I live my life in widening circles
that reach out across the world.
I may not complete this last one
but I give myself to it.

I circle around God, around the primordial tower.
I've been circling for thousands of years
and I still don't know: am I a falcon,
a storm, or a great song?

--- Rainer Maria Rilke



Daniel Yuhas is an obsessed knitter, designer, teacher and maker. His designs have appeared on *Knitty.com* and in *Luxury Yarn One-Skein Wonders*, and been displayed at the 2009 Joint Mathematics Meetings in Washington DC. He will teach this Fall at the 2009 *KnitTreat* in Laurel Highlands, PA, and leads the bi-weekly *Flatbush Stitch 'n Bitch* in Brooklyn, NY.

You can see more of Daniel's work
at: www.moltingyeti.com

About Us:

Martha Lewis is an artist and knitter who is interested in the relationship between science, technology and the arts. Many years ago she was an intern at **PS 122 gallery**, and remains a fan. She has had a wonderful experience curating ***Yarn Theory*** and has thoroughly enjoyed working with Karen and Susan on this project. In addition to thanking them, she would also like to express gratitude to Sarah-Marie Belcastro for all of her generous input and good ideas, and Alec Stone-Sweet for his patience, support, and sense of humor.

Karen Eubel is a painter and book artist, whose work can be seen at www.artistlightbox.com. In 1978 she and colleague Cynthia Karasek founded an association of artists who work in the PS122 building. **Painting Space 122** has sponsored **PS122 Gallery** since 1979 and for 30 years it has made it a place for emerging artists to get one of their first opportunities to show their work. Having recently renewed her knitting and crochet skills, Karen, along with Gallery Director Susan Schreiber and curator Martha Lewis, joined forces to present ***Yarn Theory***.

Funding and Acknowledgments:

PS122 Gallery is grateful for the support of the **New York State Council of the Arts**, **Painting Space 122, Inc.** and the **Friends of PS122 Gallery**. Many thanks to **Lion Brand Yarn** for the generous donation of materials. **PS122** has graciously donated the use of their second floor theater for our performance presentation and Derek Lloyd has offered us his time and expertise.

As the director of the gallery I would like to thank Martha Lewis, for the unique and clever idea for the show and for all her hard work curating this ambitious and intelligent exhibition in a very short amount of time; Karen Eubel, for inspiring me to think about knitting and art and for her tireless efforts teaching, creating and organizing, Lisa Daehlin for combining knitting and opera, Daniel Yuhas for all his help and support and for teaching and hosting a knitting circle. Thanks also to Daina Taimina for spending so much time with us and for generously offering to host a workshop for children. I am very grateful to all the fabulous interns: Joanna Tam, Meagan Randall, Quin Johnson, Grey, Danielle Hilkin, Brad Silk, Sarah Saraga and Kathy Chau. Many thanks also to the exhibiting artists for bearing with this small budget group and allowing us to present a show that is actually way beyond our means.

Susan Schreiber, Gallery Director

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