Block Tatting on Steroids! What Got Me Started With Hyperbolic Tatting

I saw a couple of websites about people crocheting the Great Barrier Reef in fantastic, swirling representations of corals and the critters that live there. They were fascinating and beautiful. The reef was based on mathematical models of hyperbolic planes and pseudo spheres that curl wildly. I HAD to be able to do this in Tatting!

Hyperbolic refers to an object that always grows at the same rate. The rate of increase can be anything: doubling, 3:2 (each row increases by 1 DS for each 2 DS in the previous row. 12:11, 37:22. Anything. But it is always the same. Now artistically, we can take liberties, but we'll do the simple stuff first.

Below are the websites that triggered my hunger to do this stuff.

Cabinet Magazine

Cornell University
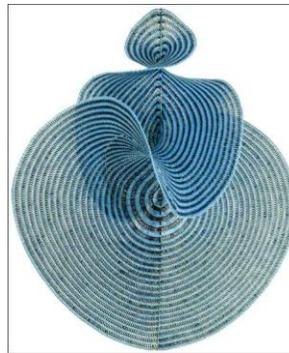
BBC

The Smithsonian

The Institute For Figuring

How to Tat a Ruffled Ball

Abbreviations
CTM – continuous thread method (do not cut the ball thread)
CLR – close ring
DNR – do not reverse work
SLT – shoe lace trick
LKJ-lock join

Start with a shuttle wound CTM
Start Ring: **1 – 1 – 1 – 1** CLR Close very firmly, DNR, SLT closed firmly

Firmly tensioning your work allows the ruffles the stiffness they need to stand up. There are only 3 picots, but the SLT functions as a lock join into a picot and the start of the first chain segment in the second row.

The picots precede the DS on all the chains of every row after the start ring. The process is to make 2 segments of a picot followed by a DS, doubling the number of DS in the previous row. A Lock Join in the next picot of the previous row finishes the segment.
Chain Segments: **– 1 – 1** lock join to the next picot on the previous row
Repeat around the circle, LKJ in the first picot of the first segment.

Work as many rounds as you like. The more you do, the greater the ruffling will be.
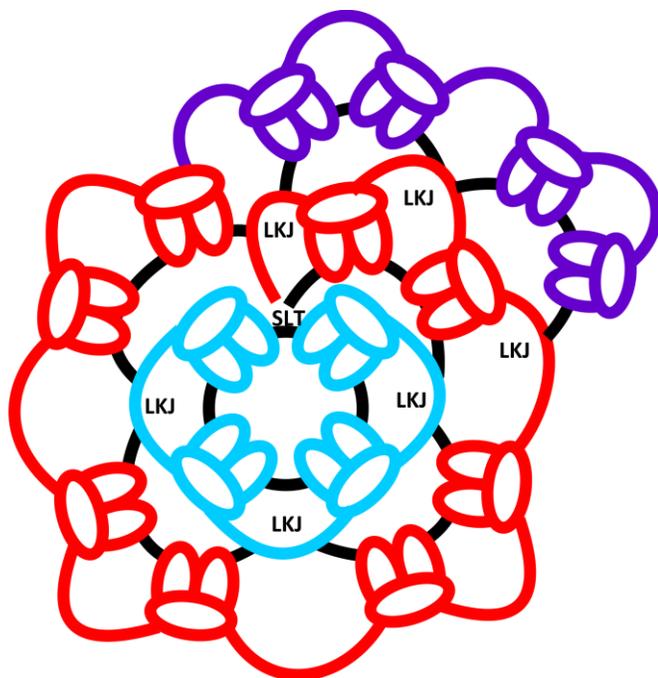
The first round is blue, the second round is red and the third round is purple.

You can see that for 1 DS in the first round there are 2 DS in the second row and 4 DS in the third row.

The core thread is shown in black.

The picots should be small joining picots, but still visible because you have to find them while you are working.

The – 1 – 1 pattern will produce quite dense ruffles.
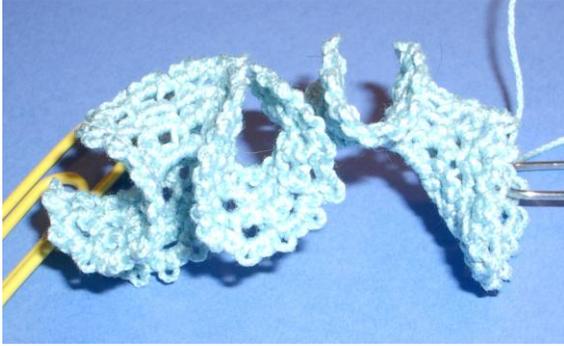
How To Tat a Ruffled Chain

This form of hyperbolic Tatting starts from a chain with picots marking off the base number of DS. In this example the base chain separates every 2 DS with a small picot where the next round will be lock joined.
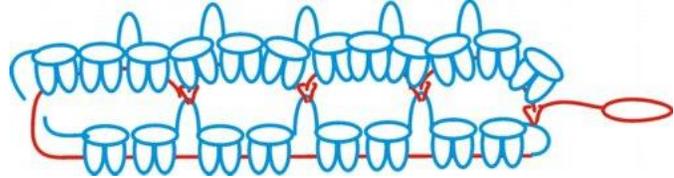
The second and succeeding rows have to do two things:

1. Mark off groups of 2 DS with a picot (provides convenient places to lock join the following row).
2. Increase 1 DS for every 2 DS in the previous row.

    NOTE: Some lock joins have a picot over them and some do not. It depends on the number and pattern of the DS and the frequency of the increases. The picots are for marking the pattern of the groups and serve as the location where you connect the next row.

Since normal block Tatting on a chain does not increase at all, the hyperbolic ruffled chain, which increases by the same multiplier in every row, becomes un-flat almost immediately.

It is possible to work Ruffled Chains on both sides of the foundation chain. The first row BELOW the chain lock joins to the core thread of the foundation chain. In this case it is wise to leave the chain a little looser in tension than normal. Working a double sided Ruffled Chain also converts the work automatically to frontside tatting only by changing the shape of the work into a continuous spiral oval.

How to Figure Out Where to Put the Picots

All Ruffled Tatting starts with a foundation row, but the only simple pattern is doubling the number of stitches in every row. The doubling pattern is 1 DS increase for every 1 DS in the previous row (2 DS in the current row for every 1 DS in the previous row). So growing from 2 DS to 128 DS only takes 6 rows (4, 8, 16, 32, 64, 128). That's a lot of picots!

The doubling pattern has the same repeating segment for the whole row:
− 1 − 1 , lock join to the next picot in the previous row
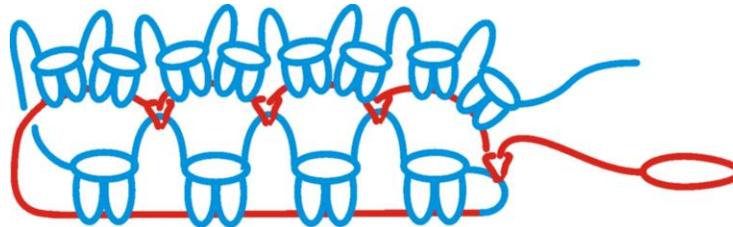
But as soon as the increase pattern is different, say, increase 1 DS for every 2 DS in the foundation row, the placement of the picots changes in a cycle depending on how many DS are between the increase DS.
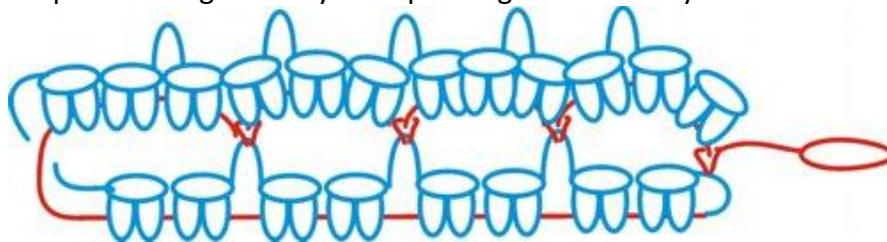
The following table shows the pattern of DS and picots to make an increase row for each specified segment pattern.

Segment Pattern	1 DS + 1DS	2DS + 1DS	3DS + 1DS	4DS + 1DS	5DS + 1DS	6DS + 1DS	7DS + 1DS	8DS + 1DS	9DS + 1DS	10 DS + 1DS
1st	− 1 − 1	− 2 − 1	− 3 − 1	− 4 − 1	− 5 − 1	− 6 − 1	− 7 − 1	− 8 − 1	− 9 − 1	− 10 − 1
2nd	repeat	1 − 2	2 − 2	3 − 2	4 − 2	5 − 2	6 − 2	7 − 2	8 − 2	9 − 2
3rd		repeat	1 − 3	2 − 3	3 − 3	4 − 3	5 − 3	6 − 3	7 − 3	8 − 3
4th			repeat	1 − 4	2 − 4	3 − 4	4 − 4	5 − 4	6 − 4	7 − 4
5th				repeat	1 − 5	2 − 5	3 − 5	4 − 5	5 − 5	6 − 5
6th					repeat	1 − 6	2 − 6	3 − 6	4 − 6	5 − 6
7th						repeat	1 − 7	4 − 7	3 − 7	4 − 7
8th							repeat	1 − 8	2 − 8	3 − 8
9th								repeat	1 − 9	2 − 9
10th									repeat	1 − 10
										repeat

NOTE: Only chain segments that start with a dash (−) have a leading picot. Lock joins do not automatically have a picot over them. The picots mark the base count of the groups of DS. If the lock join between segments falls in the middle of a base group of DS, there is no picot above it.

Here's some weird ones (also slightly hypothetical, I haven't tried them yet!):

Segment Pattern	1DS + 2DS	3DS + 2DS	5DS + 4DS	7DS + 5DS
1st	− 1 − 1 − 1	− 3 − 2	− 5 − 4	− 7 − 5
2nd	repeat	1 − 3 − 1	1 − 5 − 3	2 − 7 − 3
3rd		2 − 3	2 − 5 − 2	4 − 7 − 1
4th		repeat	3 − 5 − 1	6 − 6
5th			4 − 5	1 − 7 − 4
6th			repeat	3 − 7 − 2
7th				5 − 7
8th				repeat

Tips for the Work Process

Keep Your Shuttle on a Short Leash
You only work a few DS at a time for each segment and then make a lock join. Keep your shuttle thread as short as possible.

Keep Twist Out of the Thread
After forming the picot and DS pattern for the segment you are working, snug up the DS and then drop your shuttle in front of the work to allow additional twist on the thread to unwind. This is purely for your own sanity! The next step is to form the Lock Join, which snarl horribly if there is any extra twist present.

Finding the Next Picot
In the very first increase row, the next picot to make a lock join to is usually quite isolated and to the right of where you are working. Very quickly, however, the next picot will be directly under where you are working or even to the left of it! After dropping the shuttle (see above), spread the previous row right where you are working. My method is to look for the last picot with a lock join already in it and then find the next unused picot to the right of it.

Count Picots from the Beginning of the Row
Whatever the end count for the previous row in a Ruffled Chain, start the base count from the beginning at the start of a new row. This method provides a picot to join to at the end of every row since the beginning segment of every pattern starts with leading picot.

About Lock Joins
I prefer to make my Lock Joins by pulling the shuttle thread DOWN through the picot in the same way as a DOWN picot join. In my opinion, this produces a smoother surface and I consider a DOWN Lock Join to be worked as frontside.

I have also discovered that pulling the Lock Join to the left as you make it allows the work to have the same tension across all the DS since the lock join can force an opening in the fabric of the work if it is sitting in the center or right of the picot it is joining to.

The Hook
1. Get the right size hook for the thread you are using. The thread should lie comfortably in the hook side. Test this, and don't rely on the size on the hook. I have size 10 hooks that are smaller than size 12. Hook sizes are not uniform and I don't think they measure the finished product (modern hooks are chrome plated and the plating can change the diameter and real size of the space inside the hook significantly).
2. Using a hook is defined by pushing the hook through one way and grabbing a thread and pulling it back. When pushing a hook, push with the back of the hook. Bring the hook part down over the thread. Pull the hook and thread back toward the spot where the thread will go through. Now, don't pull the thread through, lever it. The hook is not for grabbing (and shredding), the hook is to prevent your thread from falling off.

3. The flat spot on the hook usually is different on both sides. My favorite hooks are smooth on one side and have lettering on the other. One side is the hook side. Learn which one it is and you can operate your hook by feel and speed up your work.

Working Frontside/Backside
Ruffled balls start with a ring and continue in a spiral series of chain segments. This means that you can just tat normally and the work will be frontside tatted.

Ruffled Chains have a frontside and a backside, so the backside DS are worked in reverse DS and the backside Lock Joins are UP joins. Whether frontside or backside, the picots go in the same places (you DON'T have to reverse the order of the DS counts or anything like that).

Moving From One Row to Another in Ruffled Chains
I found that I prefer the look of the side edges of the Ruffled Chains if I make 2 unflipped last half DS stitches with the shuttle thread over the ball thread. This seems to function like the turning chains in crochet by lifting the level of the working threads to the next higher row and provides a nicer side edge.

A Little Ruffled Ball
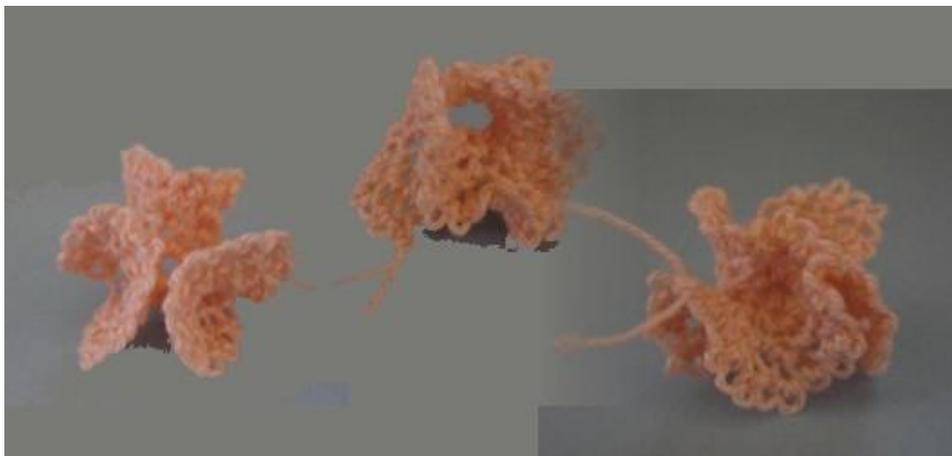
This little doodle is a simplified hyperbolic pseudo sphere (pseudo because it is really a ruffling cone). All the pictures are of the same piece. The ruffles can be rearranged endlessly.

The recommended thread size is 10 or 20.

1. Start in the center with a ring: 1 – 1 – 1 – 1 – 1 – 1 – 1 – 1 (8 DS separated by 7 picots)

2. Make a short chain segment: Shoe Lace Trick – 1 – 1
    The SLT replaces the lock join that has no picot to join to and also keeps the tatting frontside. This increase pattern has 1 DS to maintain the original count of 1 DS between picots in the foundation ring. The second DS in the chain segment is the increase DS. There are picots before each DS to give the following row a place to join to and the pciots also mark off the base number of DS.

3. Lock join to the next picot in the previous row, continue making a short chain segment: – 1 – 1. This is the basic building block of this piece. The – 1 – 1 pattern is the simplest increasing pattern and has a very fast ruffling rate.   You'll see results very quickly. When the base number of the increase pattern is more than 1, then things get a little more complicated.

4. Repeat step 3, making lock joins and short chain segments until there are 3 rounds of increase segments. End with a lock join.

5. If you want more ruffle, just keep going!

6. I just put little barrel knots on the ends of the threads. You make them like this: make an overhand knot, and then wrap the loose end overhand through the loop you just made 2 more times. Pull the knot closed slowly and it will wrap itself into a little barrel shaped knot. Trim close.

7. Now for the fun part! Play with the ruffles of the ball until they suit you. They WILL move around and can be arranged over and over again.

Ruffled Ball Flower Form

Recommended thread: Softly variegated size 20. I used Flora size 20. The leaf and bud can be anything that suits you. Clunies are NOT required! (I just like 'em).

The ruffled ball is a hyperbolic pseudo sphere. I worked 6 rows and called it quits. The increase pattern is
Lock Join – 1 – 1, the same as **A Little Ruffled Ball**.

You could follow the instructions for **A Little Ruffled Ball** and just keep going for 3 more rows, or you could try the excruciatingly, mathematically correct instructions in **How to Tat A Ruffled Ball**.

I used the tail ends of the pseudo sphere to work the ring and hide one end. I hid the last peach thread in the leaf. A ring would do just as well for a leaf. The little bit of color really strengthens the illusion that this could be a flower.

A Spiral Dangle

This little dangle could be used as a pendant on a necklace, bracelet or earrings. It is worked in size 20 Flora. A variegated thread highlights the spiral structure nicely and multicolor variegated would also work well.

Start with a chain, continuous thread method, leaving a small space before the first DS:
17 groups of 2 DS separated by picots
At the end of the row, turn the work around.

I prefer to move from one chain row to another by making 2 last half DS stitches direct tatted with the shuttle (core) thread over the working thread.   I think this makes the chain stay put since the core thread gets locked. Also, these 2 half DS lift the threads to the level of the next row and make a nice edge.

The first row of increases are reverse tatted (if you want to do frontside – backside tatting). In my opinion, backside lock joins are UP joins

The increase pattern requires 2 different segments, because for every 2 DS in the previous row, there are 3 DS in the next row. (and 2 into 3 won't go!).

Lock Join (except the first segment) – 2 – 1
Lock Join (no picot) 1 – 2

There is no picot over a lock join that does not fall at the border between two complete base number counts of DS. Since we are working with an increase of 1 DS for every 2 DS, some lock joins fall in the middle of a base count and there is no picot over those lock joins.
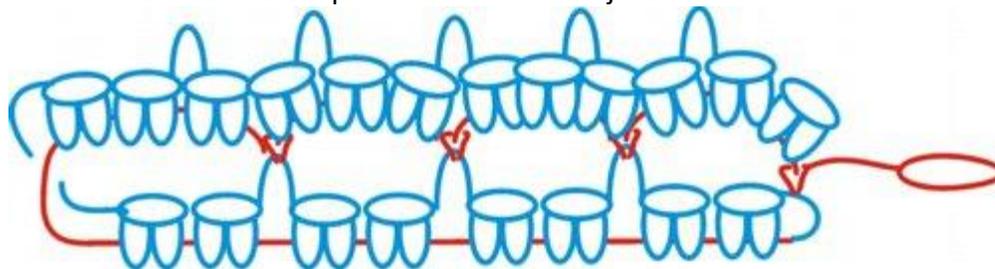
Work to the end of the row and lock join to the space left at the beginning of the work.
Turn the work around, direct tat 2 second half DS stitches, the second row of increase segments is frontside tatted.
Start the increase pattern segments from the beginning of the increase pattern shown above. This leaves a leading small picot to join to at the end of the next row.
At the end of the row, turn the work around, direct tat 2 second half DS stitches and work the third row of increase segments in backside tatting (if you so desire).

Patty Dowden 2011 rev. 2   © 2011 all uses permitted except copying this document for sale

Now you will have some kind of ruffling or waving or even spiralling going on. To reproduce this pattern, twist the ruffles around in the same direction until they lie in a spiral as shown.

Work unflipped half DS over the working thread in spiral tatting until you reach the start of the foundation chain. Lock join to it. Continue the spiral tatting until you reach the outer tip of the tip of the spiral and lock join to the piece at the tip.

Place beads on the ends of the threads, knot and trim.