

# Russian Fairy Tales

## Toy Line

### CONTENTS

1. AUTOBIOGRAPHY
2. RESUME
3. PROJECT CONCEPT & ABSTRACT
4. PROJECT PROPOSAL
5. MODELING PROCESS
6. THE PRINTING CHOICE
7. THE PRINTER
8. PRINTING PROBLEMS
9. SOFTWARE ISSUES
10. HARDWARE ISSUES
11. SLICING ENGINES
12. SLICING ENGINES CONTINUED
13. DISASTERS
14. DISASTERS CONTINUED
15. IVAN TSAREVICH
16. LESHII
17. KOSCHEI NE BESSMERTNEY
18. BABA YAGA
19. TSAREVNA FROG
20. REFERENCE IMAGES
21. REFERENCE MATERIALS
22. GANTT CHART



# Russian Fairy Tales

## Toy Line

### Project Abstract

*I will take several iconic characters from Russian Fairy Tales and Folklore- these include Koschei Ne' Bessmertny, Baba Yaga, Ivan Tsarevich, The Grey Wolf, and the the Leshii. Each character will get a fresh and unique design based on my own interpretation of them as a child as well as other references. I will then create digital models of each character with a huge attention to detail as well as give each one a visible emotional state. Finally the models will be output as actual physical toys/figures as well as rendered to be presented in a toy presentation reel showcasing the physical models alongside their digital counterparts.*

*I wish to do this without a background in toy design or manufacturing, but rather to rely on my skills as a CG artist as well as technology readily available to the general public. Beyond the design aspect of my thesis, I would like to show that prototyping physical toys can be done on a micro budget without the need for costly outsourcing; rather it can all be done right within ones home.*

# Russian Fairy Tales

## Toy Line

### Modeling & Sculpting Process

*While I come from a very traditional background of modeling I have chosen to use a very non-traditional method for my thesis project. It occurred to me that since my final output is a static sculpture/print that topology gains and loses its importance at various stages. In fact at times it even becomes a severe hindrance. Due to this I chose adopt a very freeform style and did not conform to a specific pipeline. This allowed me to approach each model in a unique way that best suited it. I describe each unique sequence of tools I used for each toy later in this document but overall these are the methods I mixed and matched to produce my digital sculptures:*

- 1.) Traditional Quad Modeling in Maya**
- 2.) Rigging and posing quad models in Maya**
- 3.) Importing Quad Models for Subdivision Level Sculpting in Zbrush**
- 4.) Creating Models from Zsphere based Adaptive Skins in Zbrush**
- 5.) Using Dynamesh on Quad Models and Zsphere Adaptive Skins**
- 6.) Retopologizing Using Maya and Zbrush projection System**
- 7.) Retopologizing using Qremesher in Zbrush**
- 8.) Decimation Master for polygon reduction in Zbrush**
- 9.) 3d Coat for Voxel Sculpting a base mesh**
- 10.) Microsoft Kinect/ReconstructMe for 3d Scanning a live model**

# Russian Fairy Tales

## Toy Line

### The Desktop Rapid Prototyping Decision

*I had initially chosen to use a service in Belgium (iMaterialise) to do the 3d Printing/Prototyping aspect of my thesis. I had gone as far as having them prototype sample models for me. After some trials I realized that to stay within my micro budget I could only have my models be a maximum of 6 inches tall and could only have enough budget left to produce a single mold and casting of each. One issue would have been if a model was damaged in the mold making process I did not have the budget to have it reprinted. This was a considerable worry because the prints were very fragile.*

*The solution that presented itself was the thought of printing them at home. This was an attractive idea because I strongly wanted to be responsible for all aspects of producing the figures. After a heavy amount of research I found that hobbyist prototype machines, while initially produce rough and simple results, could actually produce results extremely close to industrial machines with a lot of practice and ingenuity. I also realized that it was also only a little bit more than the budget I had set aside for both printing and mold making costs, but I would have the freedom of printing at a larger scale and be able to print as many as I would like.*

*My worries were numerous however. I was unable to find any example of an ultrahigh detail model being printed because the printer had not yet shipped to customers. Even after it did I was unable to find anyone trying such hi resolution models, or anything above the 10k poly range (I would later find out why). My models averaged 20mil polys. There would also be no time to return the printer and send the models off for printing if it didn't pan out because the printer would take 8 weeks to arrive after ordering and having something prototyped in Belgium could easily take 2-3 weeks. Ultimately I threw caution to the wind and ordered the printer a bit blindly. Little did I know when it would arrive that the problems I had anticipated would be the least of my concerns.*

# Russian Fairy Tales Toy Line

## The Printer & The Procedure

*Printer: Makerbot Replicator II*

*Price: \$2,200*

*Type: Fused Filament Fabrication*

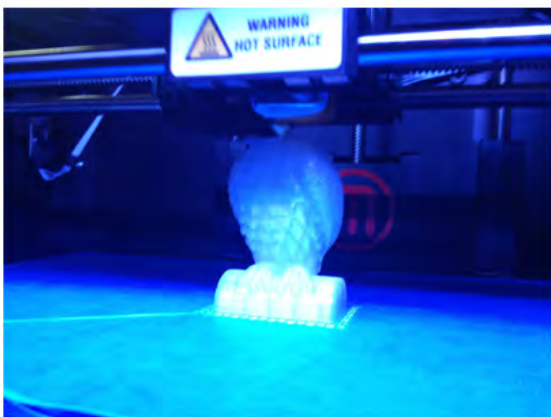
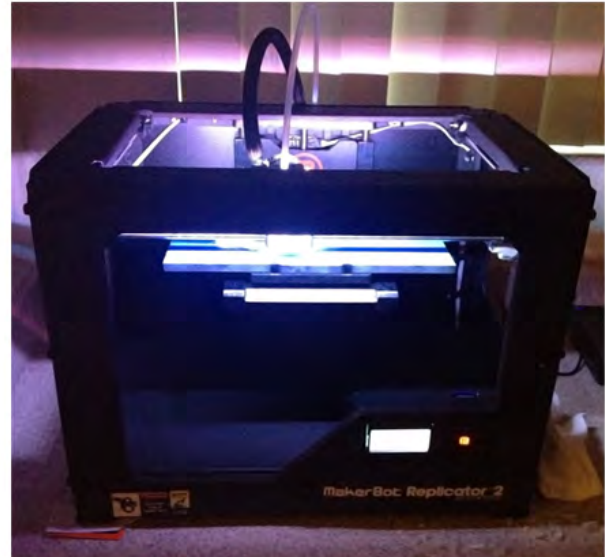
*Material: PLA (Polylactic Acid)*

*Build Volume: 11.2in x 6.0in x 6.1in*

*Layer Resolution: 100 Microns (0.1mm)*

*Position Precision: X/Y Axis 11 Microns*

*Z Axis 2.5 Microns*



- 1.) Level Build Plate to 100 Micron Accuracy
- 2.) Apply Painters Tape to Build Plate
- 3.) Apply Acetone to Build Plate
- 4.) Heat Extruder
- 5.) Load Filament
- 6.) Apply Canola Oil to filament.
- 7.) Keep Ambient Air Temperture Fixed
- 8.) Connect Conveyer Service to Printer
- 9.) Send Slice Data to printer
- 10.) Print!
- 11.) Remove print for build plate
- 12.) Remove Support Structures
- 13.) Sand Prints in rough areas
- 14.) Coat with Auto Primer
- 15.) Apply finish or paint of choice.

# Russian Fairy Tales

## Toy Line

### Printing Limitations and Issues

*When I initially was debating purchasing the printer, my concern was if it would produce the quality I needed. Soon I realized I had many more hurdles to figure out before I even got to that stage*

#### **SOFTWARE LIMITATIONS/ISSUES:**

- 1.) *Typical 3D Model formats cannot be printed.*
- 2.) *Models with multiple parts cannot be printed.*
- 3.) *Models with overhangs cannot be printed.*
- 4.) *Non-Airtight models cannot be printed.*
- 5.) *Overlapping polygons cannot be printed.*
- 6.) *Models over 50k polygons cannot be processed.*

#### **HARDWARE LIMITATIONS/ISSUES:**

- 1.) *Printer vibrations degrade print quality.*
- 2.) *PLA Material rarely adheres properly to build plate.*
- 3.) *PLA shrinks when it cools causing warping in prints.*
- 4.) *PLA tends to burn and leave debris in nozzle causing jams.*
- 5.) *Build plate is slightly warped causing uneven printing.*
- 6.) *Temperature fluctuations in environment cause printer inconsistency.*
- 7.) *PLA material absorbs water from air and can swell causing jams.*
- 8.) *Extruder system's plunger design fundamentally flawed causing jams.*
- 9.) *Nozzle easily damaged and needs replacing.*
- 10.) *Belts need constant re-tensioning.*
- 11.) *Filament feeding system prone to getting stuck and causing knots.*
- 12.) *Onboard temperature regulator inaccurate.*

# Russian Fairy Tales

## Toy Line

### Preparing Models & Overcoming Software Problems

Before I could worry about finishing the issues with the printer I had to find a way to prepare my ultra hi res models into a format the printer could understand. 3D Printers function off of a language called Gcode. Gcode holds the data for ever layer the printer will print. This data includes:

- **X+Y Position data**
- **X+Y Travel Speed data**
- **X+Y Axis Filament Feed Rate**
- **Support Structure Data**
- **Shell Count Data**
- **Z Axis Layer Height data**
- **Active Cooling Fan Data**
- **Filament Temperature Data**
- **Infill Amount and Pattern**
- **Raft Pattern Data**

All of these instructions must be present for every layer of a print. A model must be sliced into these layers via a slicing engine. Every engine functions differently and has strengths and weakness. The one thing they all have in common is the need for a model in STL format with a perfectly clean and water tight surface; something that is not common in traditional CG modeling.

To prepare my models I went through a variety of different methods, most met with failure to produce a water tight manufacturable surface and or resulted in severe degradation of my sculpted detail. This was especially prevalent in models composed of multiple subtools. Options that I tried that failed consistently was Dyna-meshing, re-meshing, projecting on new topologies and booleans. It took a combination of softwares to produce the results I needed.

- 1. Decimate Subtools In Zbrush to lowest level before details began to suffer.**
- 2. Export to Maya as OBJ files. (STL Export in Zbrush loses relative scale data).**
- 3. Inverse Normals in Maya and Export as Binary STL files.**
- 4. Open in Materialise 3-Matic software. Run desired repair algorithms.**
- 5. Use Advanced CAD boolean functions.**
- 6. Repair functions again (specifically for noise shell removal).**
- 7. Export new surface as STL part file.**

# Russian Fairy Tales

## Toy Line

### Solving Hardware Issues

After figuring out my software hurdles I quickly realized that the printer was not a very user friendly machine and while it printed premade object files it shipped with easily, anything that was custom made required more finesse. In the case of my very hi resolution “printer unfriendly” models it required several months of ripping out hair. Many of the solutions came from trial and error as well as scouring the internet to see what other hobbyists had found worked and did not work. With the solutions below I have gone over the last few months from have **9 out of 10 prints failing** to **1 out of 3 failing**.

#### **Vibration Issue:**

*Added rubber feet to bottom of printer.*

#### **PLA Doesn't Stick to Plate/Warps:**

*Used Blue painters tape and acetone on build plate.*

#### **PLA Burns and Jams:**

*Found butter zone temperature and coated filament with canola oil.*

#### **Build Plate Warps:**

*Had a steel build plate machined as a replacement.*

#### **PLA Absorbs Moisture:**

*Keep it seal with desiccant packages until print time.*

#### **Extruder System Design Flaw:**

*Printed a new extruder design and purchased additional hardware to install.*

#### **Nozzle Easily Damaged:**

*Keep a stock of spare nozzles.*

#### **Belts Lose Tension:**

*Re-Tension belts every 100 hours.*

#### **Filament Feeder Gets stuck and make Knots:**

*Printed a new feeder spool and replaced.*

#### **Onboard Temperature Inaccurate:**

*Manually Measure temperture and compensate in software.*



# Russian Fairy Tales Toy Line

## Slicing Engines and GCode Compilers

As mentioned previously before a model can ever be printed in must be compiled into Gcode. There are numerous softwares and engines that can do this, ones I came across were:

-Slic3r

-Makerbot Slicer

-Skienforge

-KISSlicer

- ReplicatorG

- Cura

I was unable to get KISSlicer or Cura functioning on my hardware so my tests were primarily run on Slic3r, Makerbot Slicer, and Skeinforge (ReplicatorG uses a derivative of skeinforge). My test object was a bust of my "Ivan" figure. He clocked in at 1.1 million polys.

Ivan Tsarevich Bust  
1.1 Million Polygons  
Slicing Engine:Slic3r  
Layer Height: 0.1mm (100 microns)  
Temp: 215 Degrees  
Print Time: 3hrs 20m



Ivan Tsarevich Bust  
1.1 Million Polygons  
Slicing Engine: Makerbot Slicer  
Layer Height: 0.2mm (200 microns)  
Temp: 215 Degrees  
Print Time: 2hrs 05m



Ivan Tsarevich Bust  
1.1 Million Polygons  
Slicing Engine: SkeinForge  
Layer Height: 0.1mm (100 microns)  
Temp: 215 Degrees  
Print Time: 3hrs 45m



Ivan Tsarevich Bust  
1.1 Million Polygons  
Slicing Engine: Makerbot Slicer  
Layer Height: 0.34mm (340 microns)  
Temp: 215 Degrees  
Print Time: 1hrs 25m



Ivan Tsarevich Bust  
1.1 Million Polygons  
Slicing Engine: Makerbot Slicer  
Layer Height: 0.1mm (100 microns)  
Temp: 215 Degrees  
Print Time: 3hrs 30m



Ivan Tsarevich Bust  
1.1 Million Polygons  
Slicing Engine: SkeinForge  
Layer Height: 0.05mm (50 microns)  
Temp: 215 Degrees  
Print Time: 8hrs 30m



# Russian Fairy Tales

## Toy Line

### Slicing Engines and GCode Compilers Continued

I tried 6 different tests. One test with Slic3r, two tests with Skeinforge and three tests with Makerbot Slicer. Each one was done at different detail levels. The images I have included on the preceding page all give the exact layer height I used, the slicer name, and the amount of time it took to print.

The bust was over a million polygons after decimation which again was a great success for me as I now felt I could compress the majority of my models. I accomplished this despite the limitations of the software by installing PyPy, a python acceleration and by bypassing Gcode files and compressing directly to SD card compatible X3G files.



The bust had over-hangs greater than 45 degrees hence support material was calculated different in each engine. The Skeinforge material was very thin and easy to remove but left a lot of clean up on the model giving it a very dirty appearance. Makerbot slicer gave a very rigid structure that required a lot of force and even pliers to remove. Slic3r produce a flimsy material that was easy to remove but it was adhered to the model too strongly which left the highest amount of extra plastic on the model.

A real success I had was that I was actually able to get my printer down to 0.05mm (50 microns) which is twice the detail level it is rated for. It took ages (over 8 hours for a 2 inch print) but created a very smooth surface.

After these tests (and dozens more not shown) I came to my final print settings:

- Skeinforge
- 100 Microns
- 3 Shells
- 15% Infill
- 210-220 Degrees
- Raft + Support Structures

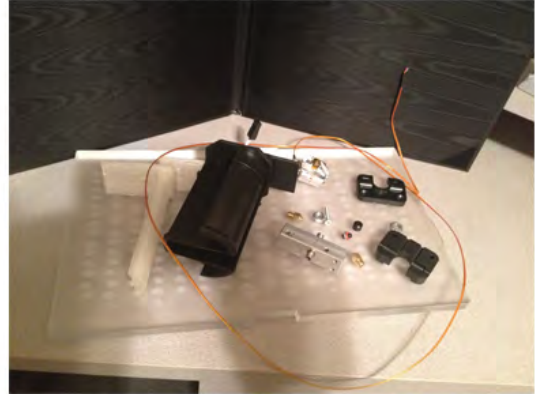
# Russian Fairy Tales Toy Line

## Disasters!

*As I had previously mentioned I had far more failed prints than successful ones for a long time. I could fill a book with all of the failures but here are some highlights!*



*This was an early test print. The Support Structure Failed resulting in the trunk not being printed and the ears having debris attached.*



*It's doesn't look like much, but that is \$400 worth of parts I had to replace on the printer. Had to get handy with a soldering iron too.*



*This is an example of what happens when burnt plastic gets jammed in the nozzle. The amount of plastic released is minimal and therefore the print is weak and falls apart.*



*This is a comparison of a successful print and one that was plagued by jams.*

# Russian Fairy Tales Toy Line

## More Disasters!



*Another example of minor jams during printing that result in a surface full of gaps and errors.*



*These are parts that were printed far too thin for the printer to be able to handle.*



*Here I learned the perils of running the printer too hot!*



*Here you can see how large objects shrank and warped while being printed, the two halves no longer line up despite being razor straight.*





*The Result of a major jam halting the printer.  
That is 15 wasted hours right there.*

## The Leshii

The Leshii is a being known to inhabit the woods, they are a staple of Russian fairy tales and folklore and have often times appeared in many stories as both protagonists and antagonists. There are many Leshii, however stories rarely feature more than one. They are woodland spirits that protect the forests and the animals in them. They have appeared in not only Slavic folklore but also in many video games including some Final Fantasy titles, the Hellboy comic series, the Supernatural TV series, and various other forms of media.

The Leshii is generally described as a male with a beard and hair made of vines and other plant material, he can be very tall or short (sometimes can change size at whim), his skin is either pale or depicted as more plant like material, and his eyes are bright green.

Female Leshii are called Leshichikha and children are called Leshonky. Leshii are very mischievous and while they rarely mean any true harm (though on occasion they are under the employ of Baba Yaga or Koschei) they often times can make people sick or attempt to trick and lure away peasants to their caves and tickle them to death. If a Leshii is encountered in the forests, the person who sees them gets lost immediately. The only way to find your way home would be to put all of your clothes inside out and shoes on the opposite feet. However in stories farmers and peasants are known to make deals with Leshii to protect their land and their crops.



# Russian Fairy Tales

Toy Line

## The Leshii

Concept Art

Leshii Final Concept  
Peter Gend



RUSSIAN FAIRY TALES  
THE LESHII  
POSE STUDIES



# Russian Fairy Tales Toy Line

## Making the Leshii

Leshii was actually the first toy I had begun sculpting. He was initially begun with zSpheres. The version you see below, while a design wise was appealing to me, it ultimately did not properly represent the character was abandoned fairly quickly.



I took a hiatus to work on other toys and then came back to Leshii, starting instead with a Maya mesh. This led to my final leshi sculpt that matched my original art closer. The progress of the model over time can be seen below.



# Russian Fairy Tales

Toy Line

## The Leshii Final Sculpt



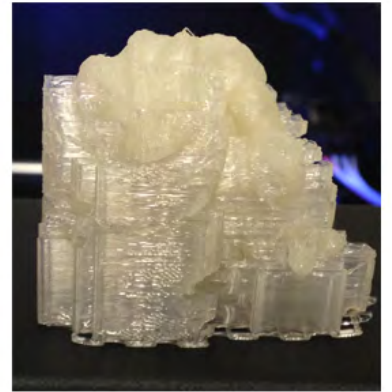
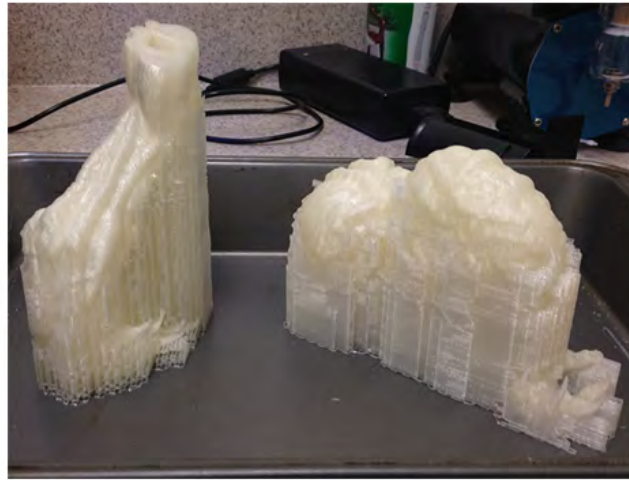


# Russian Fairy Tales

## Toy Line

### Printing the Leshii

By the time I got to printing the final Leshii, I had already solved most of my issues. In fact I had printed a much smaller scale one early on (shown below in grey). I did have many printer failures but overall he was easier to design part wise.



# Russian Fairy Tales

Toy Line

## The Leshii Final Toy



# Russian Fairy Tales

Toy Line

## The Leshii Final Toy



# Russian Fairy Tales

Toy Line

## The Leshii

### Final Sculpt & Toy



## Koschei Ne Bessmertny

Translated in English to Koschei The Deathless, a common villain in many Russian stories and fairy tales. He has been a pop culture reference in many books, movies, songs, and graphic novels in Russia, other nations with Slavic origins as well as more recently in the United States. He has even appeared in the Neil Gaimans sandman, marvel comics, and very recently in Hellboy along with Baba Yaga. He is very closely tied to Baba Yaga, another famous villain in Russian children's stories.

His appearance is significantly different in every depiction he has had, primarily due to the fact that his physical appearance had never been described in the classic fairy tales and folklore. However ever there are clues in the stories as to possible appearances. He is often described as extremely ugly and haggard. Even his name, Koschei, is a variation on the Russian word "kost" (pronounced "coist") meaning bone. Hence he is most often portrayed as a haggard looking old man, usually in a cloak or rags, extremely ugly, and very thin and boney. However despite his various appearances he is extremely strong and has magic abilities.

Koschei cannot die by any conventional means, his physically body cannot be destroyed. However his soul lies inside of a needle. That needle is in an egg, the egg is in a duck, which is inside a rabbit, which is locked inside a chest. The chest is hidden on a desert island called Buyan.

# Russian Fairy Tales

Toy Line

## Koschei Ne' Bessmertny

Concept Art



Peter Gend



Koschei Ne' Bessmertny  
Concept  
Peter Gend



Concept  
Peter Gend



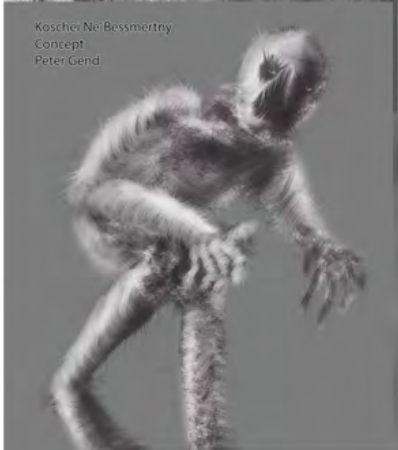
Koschei Ne' Bessmertny  
Concept  
Peter Gend



Koschei Ne' Bessmertny  
Concept  
Peter Gend



Koschei Ne' Bessmertny  
Concept  
Peter Gend



Koschei Ne' Bessmertny  
Concept  
Peter Gend



Koschei Ne' Bessmertny  
Concept  
Peter Gend



Koschei  
Concept  
Art



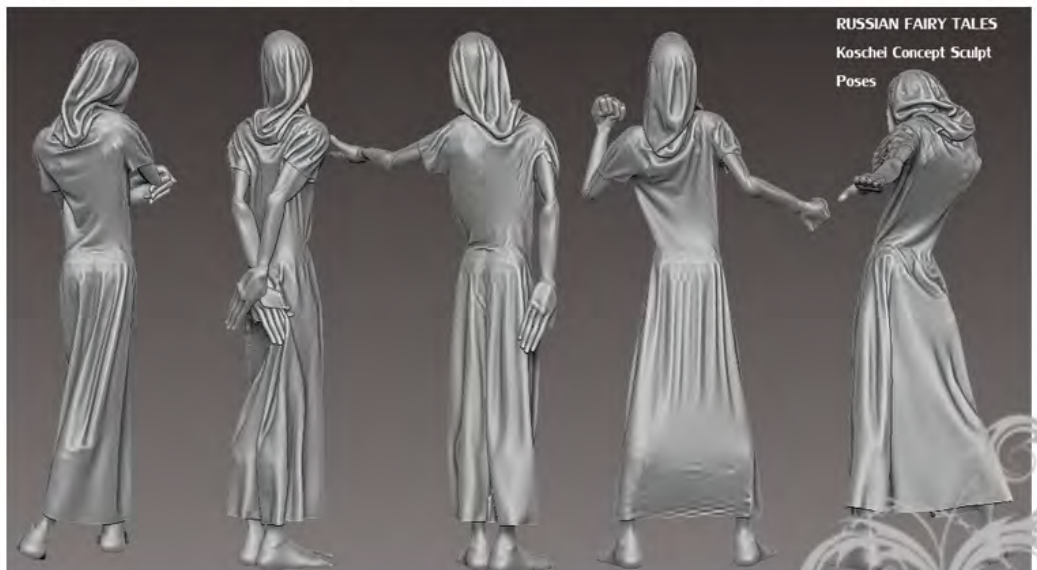
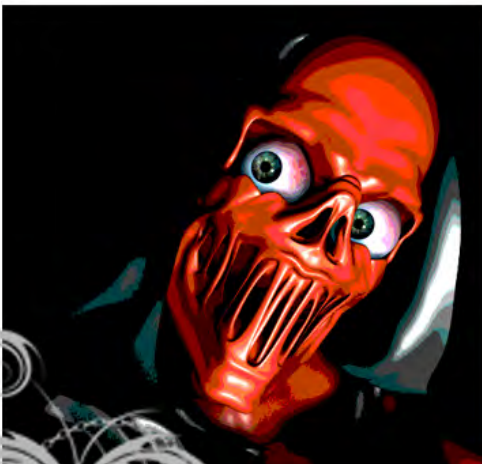
Koschei Ne' Bessmertny  
Concept  
Peter Gend

# Russian Fairy Tales

Toy Line

## Koschei Ne Bessmertny

Concept Sculpt



# Russian Fairy Tales

## Toy Line

### Making Koschei Ne Bessmertny

I decided fairly quickly that I very much liked my original concepts for Koschei and that I wanted him sitting in a throne as a show of power. Since I knew what direction I was going in I did all base modeling in Maya with polys.



I had initially detailed Koschei very heavily to cater to using a printing service. When I purchased my Replicator I realized I would not be able to achieve anything close to that resolution. So you will see his detailed decreased. I also spent a good deal of time designing his throne as seen below with the heads created independently.



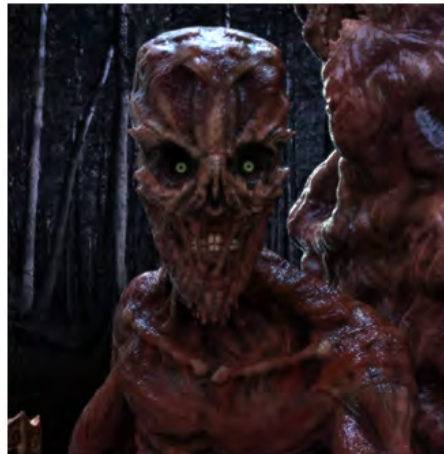


# Russian Fairy Tales

Toy Line

## Koschei Ne Bessmertny

Final Sculpt



# Russian Fairy Tales

## Toy Line

### Printing Koschei

Koschei was one of the more problematic prints. I struggled with producing the detail I needed constantly. You can see he was printed in multiple scales, none of which ever replicated the detail. I also had many issues with printer jams (gaps in print).



# Russian Fairy Tales

Toy Line

## Koschei Ne Bessmertny

Final Toy



# Russian Fairy Tales

Toy Line

## Koschei Ne Bessmertny

Final Toy



# Russian Fairy Tales

Toy Line

## Koschei Ne Bessmertny

### Final Sculpt & Toy





## Baba Yaga

One of the most widely known Russian characters, she has been a key villain of Russian and other Slavic folklore for hundreds of years. Much like Koschei, she has not only been depicted in classic tales but also has been very popular in recent years appearing in the Hellboy comic books, many Hollywood films, The X-men comics, Sandman, Masquerade: The Vampire Chronicles, and more. Her appearance is actually well described in many stories even if it does differ from era to era.

She is generally seen as a haggard and vile old woman, often time hunchbacked, with a very large hook nose, and broken teeth. She is often seen traveling and flying in a large mortar with pestle. A broom she keeps behind her is used to wipe away her tracks so that there is never a trace of her. She is also very well known as a cannibal, eating country dwellers and children. She lives in a house that can get up and move itself due to the fact that it is held up by chicken legs. The keyhole to the house is a large maw full of razor sharp teeth and often is invisible until a special phrase is uttered. The fencing around the house is also typically made of human bones.

She is most often portrayed as a villain however on rare occasion some character may go to her to seek her advice, which she generally is reluctant to offer due to her aging a full year every time she answers a question. She often times is considered an underlying of Koschei, however in more modern tales as well as version of her in comic book adaptations she often is the holder of the needle that holds Koschei's soul.



# Russian Fairy Tales

Toy Line

## Baba Yaga

Concept Art and Sculpt

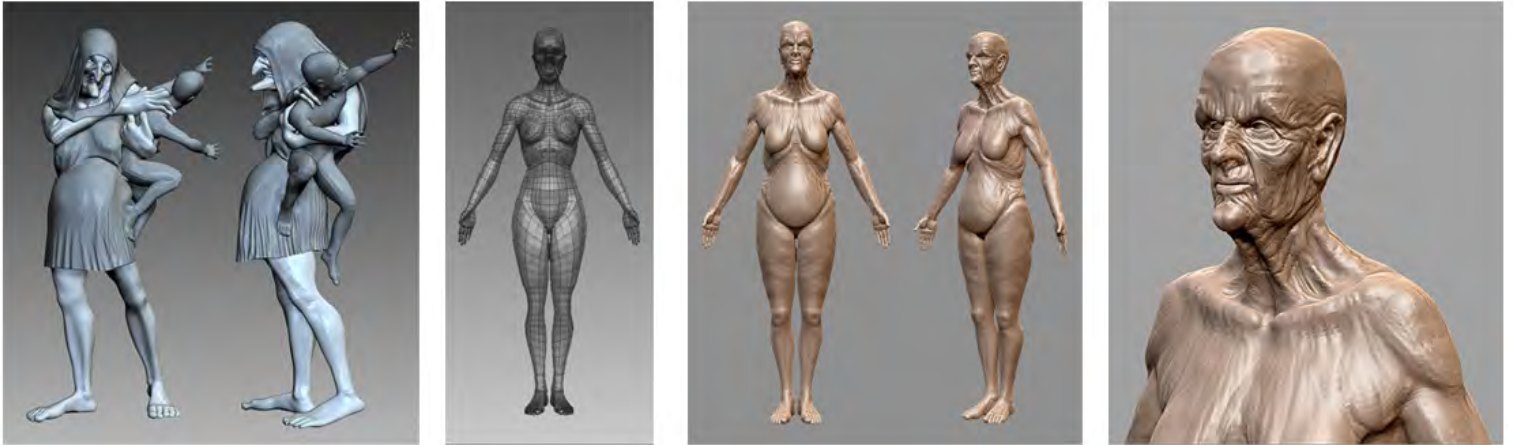


# Russian Fairy Tales

## Toy Line

### Making Baba Yaga

Baba Yaga was easily my biggest challenge at the modeling/design phase simply because I was not happy with my concept art and did not have a clear vision of what I truly wanted. I wanted something different that the traditional renditions of her.



While I was still unhappy with the overall look, I still began experimenting with more poses, below are some of the results. Every pose was achieved with rigs built in Maya and bringing base meshes to and from zBrush using GoZ.





# Russian Fairy Tales

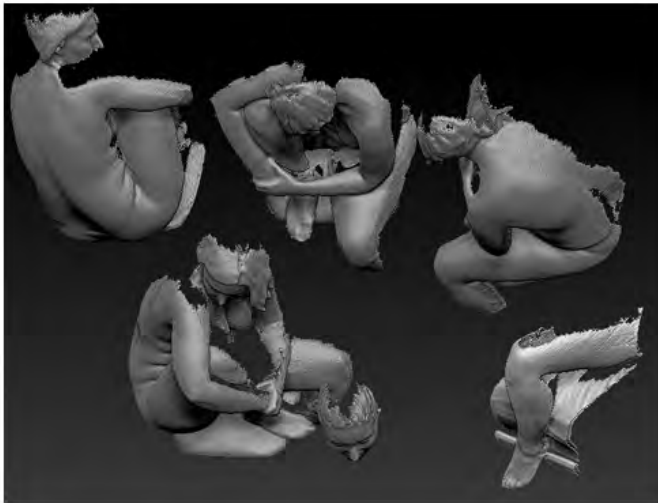
## Toy Line

### Making Baba Yaga

Just by luck I came across an article about a person who uses a Microsoft Kinect as a 3D scanning device. At just \$150 I invested in one hoping it would be a good tool to scan live actors in order to help prototype for toys, here is my successful first result:



While the data was extremely messy and I had to learn command line software, it proved to be an invaluable tool. It was not a time saver, the time to clean up the data was excessive, but it was a lifesaver in helping find my final Baba Yaga design.

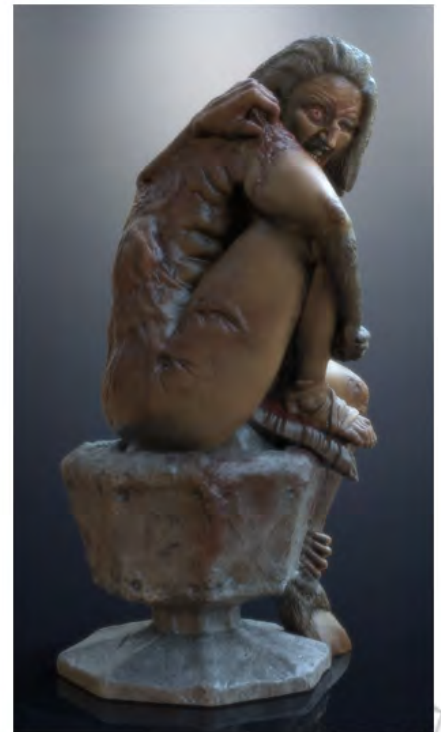
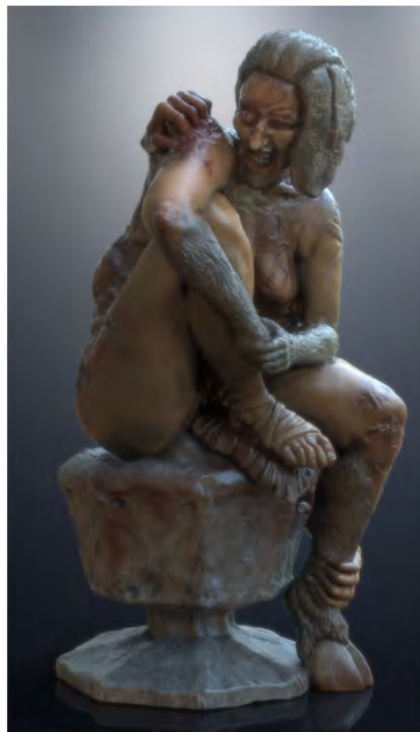
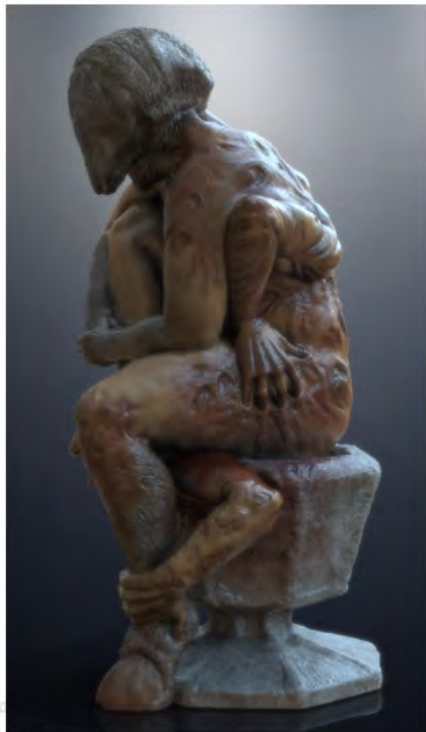


# Russian Fairy Tales

Toy Line

## Baba Yaga

Final Sculpt



# Russian Fairy Tales

## Toy Line

### Printing Baba Yaga

Baba Yaga, while completely uneventful in the print process, proved to be a great success. Every print prior to Baba Yaga was part of my experimentation process on every front. From modeling process to digital surface preparation, all prior toys differed slightly in pipeline. With Baba Yaga I took the best of all scenarios. The fact that Baba Yaga printed without any errors, and all pieces interlocked perfectly, I feel shows that all the trial and error was well worth it. Had I known everything I knew from the beginning, this would have been a much easier journey!



Baba Yaga's Pestle was also the only piece I made to be printed without any support structure. It made the clean up much easier and faster.



# Russian Fairy Tales

Toy Line

## Baba Yaga

Final Toy



# Russian Fairy Tales

Toy Line

## Baba Yaga

Final Toy



# Russian Fairy Tales

Toy Line

## Baba Yaga

Final Sculpt & Toy



# Russian Fairy Tales

## Toy Line

### Ivan Tsarevich & the Grey Wolf Bio

Ivan Tsarevich is the primary hero of Russian fairy tales. Unlike several of the previous characters his roots are more firmly Russian and less in overall Slavic mythology there are references to him there as well. He is always the youngest of three brothers in a story and often times viewed as the dumb one, the weak one, or the black sheep of the family. Another important fact about Ivan, is that the Ivan in one story to the next is not necessarily the same person or character as in each tale he may have a different background. Ivan always seems to have a clean slate from one story to the next. He is also known as Ivan the Fool in some stories (keeping in mind that the word fool in Russian had a different connotation when written, not being negative, more like being simple but good hearted).

Ivan's physical appearance is rarely ever described beyond being thin or muscular, tall or short, and his outfits will differ from story to story as well. In many illustrations however he is depicted wearing very traditional Russian nobleman clothing.

Ivan is most famous for the story Ivan Tsarevich, Cerai Volk, y Zhar Ptiza, (Ivan Tsarevich, the Gray Wolf and the Firebird). This story features the most memorable illustrations that feature Ivan including him and the princess riding a large wolf that can fly as well as a scene of him plucking the feather from the firebird. Ivan has also had many stories were he has been entangled with Baba Yaga and Koschei as well.

# Russian Fairy Tales

Toy Line

## Ivan Tsarevich

Concept Sculpt





# Russian Fairy Tales

## Toy Line

### Making Ivan Tsarevich & the Grey Wolf

Ivan was the second toy/sculpture that I attempted (after an unused attempt at Leshii). I chose to use zBrush's zSphere feature and based the initial pose on Bernini's David sculpture. The face was based on images of my dad as a younger man in his late twenties. I also went through multiple clothing styles before arriving at the final look.



After completing Ivan I still felt that there was very little way for him to be identified as Ivan Tsarevich from Russian folklore, primarily because Ivan was rarely ever described in detail or never heavily elaborated on despite being one of the most common and mainstay characters. I realized that his companion in the most famous tale, Ivan Tsarevich and the Grey Wolf would be the best way to help the toy be more identifiable. The wolf was built in Maya polys and detailed in zBrush.



# Russian Fairy Tales

Toy Line

## Ivan Tsarevich & the Grey Wolf

Final Sculpt

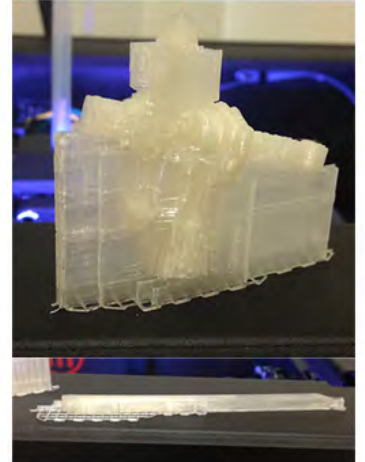


# Russian Fairy Tales

## Toy Line

### Printing Ivan Tsarevich & the Grey Wolf

Ivan was not my first print but was easily the most challenging. Due to many very thin parts and high detail he had to be printed in multiple interlocking parts. In the end Ivan, the wolf, the sword, and the base were printed in 9 separate parts.

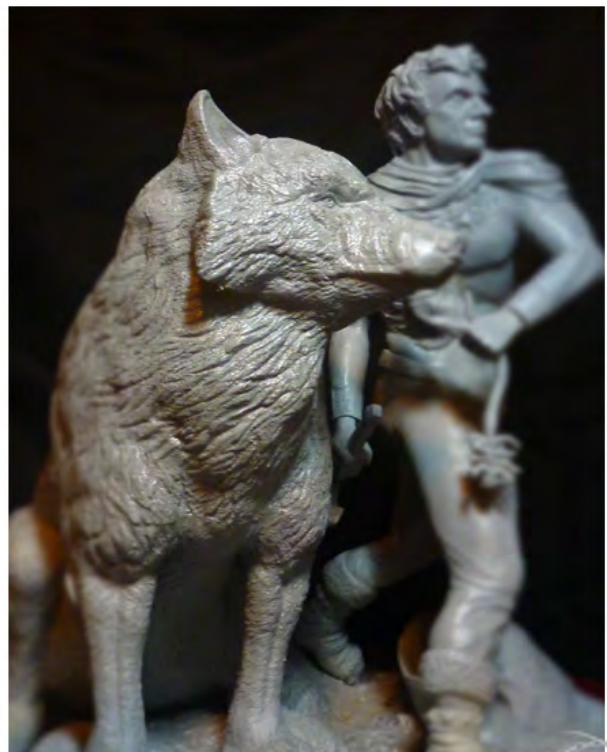


# Russian Fairy Tales

Toy Line

## Ivan Tsarevich & the Grey Wolf

Final Toy



# Russian Fairy Tales

Toy Line

## Ivan Tsarevich & the Grey Wolf

Final Toy



# Russian Fairy Tales

Toy Line

## Ivan Tsarevich & the Grey Wolf

### Final Sculpt & Toy





## Tsareyna Legushka

The story of the Frog prince is one that has now spanned nearly every continent in the world. It has especially made major landfall in the United States recently with the Disney film “The Princess and the Frog”. There have been countless renditions of the tale, especially made famous by the Brothers Grimm. The story typically entails a princess overlooking the physical appearance of the frog and kissing him, to have him transform into a human. The Russian and Italian versions of this tale do actually reverse the roles.

In the Russian one specifically, a King sends out his three sons to marry. They are to find their brides by shooting arrows into the air. Where the arrow lands the princes will find their brides. It is in fact Ivan Tsarevich once again as the youngest of three sons who’s arrow is caught by the frog or lands in the frog’s mouth.

The frog turns into a princess, Ivan is elated and they fall in love. To celebrate finding his wife, Ivan burns her old “frog skin”, which apparently is forbidden to do without waiting three days first. This causes her to vanish. He seeks out Baba Yaga and convinces her to help him find the Frog Tsarevna. Baba Yaga reveals that it is in fact Koschei that holds her prisoner. Ivan must then find the needle that will destroy Koschei. In other variations of the story it is in fact Baba Yaga that is holding the Tsarevna Frog captive, and Ivan must outwit her.

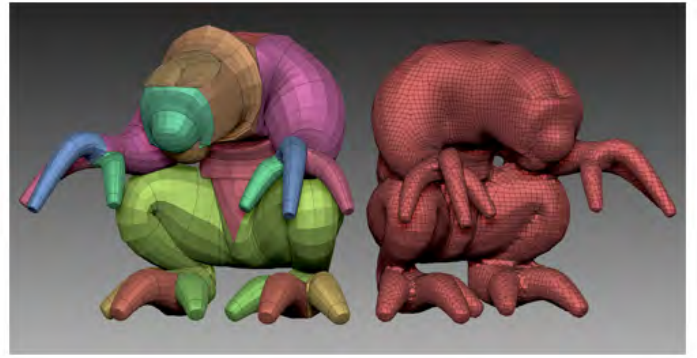
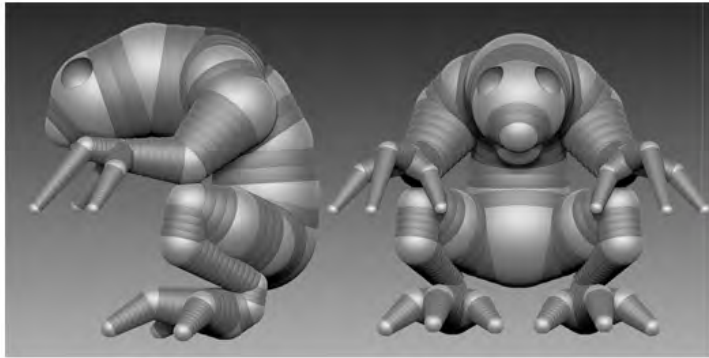


# Russian Fairy Tales

## Toy Line

### Making the Tsarevna Legushka

Originally intended to simply be an accessory to Leshii, she quickly became a favorite to sculpt so I continued detailing her far more than required for such a small part. I began with zSpheres and then converted to Dynamesh.



Sculpting the Tsarevna was also by first time using a Cintiq monitor, which was an amazing experience to be able to sculpt almost like I was drawing. I highly contribute the monitor/Wacom to the sheer amount of time I ultimately spent on this one. In the end I am glad I did as I feel she really does round out the toy line very well, even though she was not originally planned.





# Russian Fairy Tales

Toy Line

## Tsareyna Legushka Final Sculpt

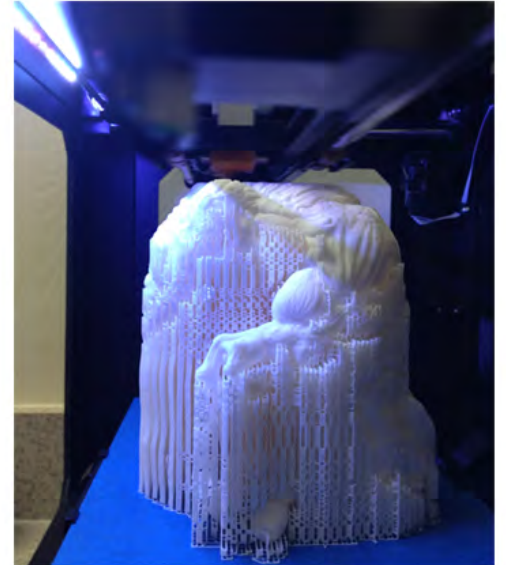
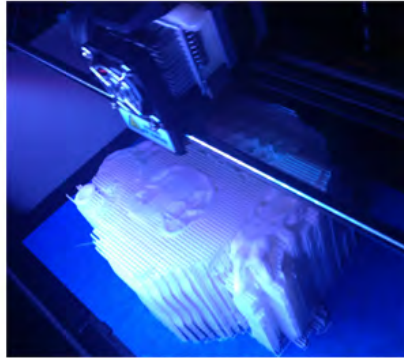


# Russian Fairy Tales

## Toy Line

### Printing Tsareyna Legushka

This was the final toy I printed. I developed a clog while printing and had one failed print but otherwise it went off without a hitch. This was also the longest print I had for a single piece, clocking in at 49 hours for the main body.

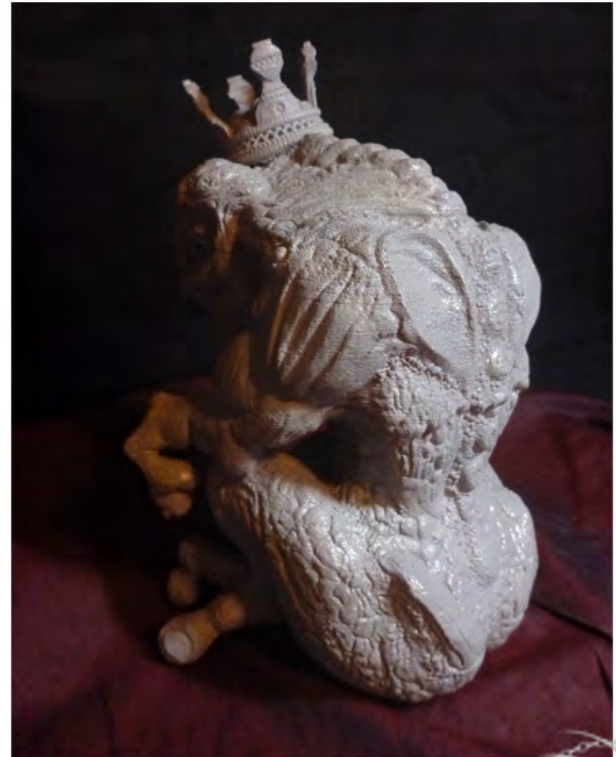


# Russian Fairy Tales

Toy Line

## Tsareyna Legushka

Final Toy



# Russian Fairy Tales

Toy Line

## Tsareyna Legushka Final Toy



# Russian Fairy Tales

Toy Line

## Tsareyna Legushka

### Final Sculpt & Toy





# Russian Fairy Tales

## Toy Line

### References

#### Russian Fairy Tales (Originals):

Koschei the Deathless  
Death of Koschei the Deathless  
Vasilissa the Beautiful  
Iyashiko and the Witch  
The Baba Yaga I-VI  
The Frog Tsarevna  
Baba Yaga and the Brave Youth  
Maria Moreyna  
Ivan Tsarevich, the Firebird, and the Grey Wolf

### Graphic Novels

Neil Gaiman's Sandman- Issue #38 ("The Convergence")  
The Sandman: Fables and Reflections  
Hellboy: The Chained Coffin and Others  
Hellboy: Darkness Calls,

### Other Printed References

Baba Yaga: The Ambiguous Mother and Witch of the Russian Folktale  
Enchantment by Orson Scott Card  
Of the Russe Common Wealth by Giles Fletcher, the Elder  
Secret service of Tsar Pea by Andrey Belyanin's  
U Lukomoria by Andrey Alivierdiey's  
Igor Stravinsky's The Firebird.

### Films

Vasilisa the Beautiful by Aleksandr Rou  
Howl's Moving Castle  
Bartok the Magnificent  
Mr. Dough and the Egg Princess  
Beloved Beauty (1958)