

# Stop Motion Green Guide by StopMoLab

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# Introduction

**Paulina Zacharek,**  
Head of StopMoLab



**Aleksandra Wawrzynkiewicz,**  
Coordinator of StopMoLab



StopMoLab is an international, intensive training program for novice creators of stop-motion animation. It responds to the needs of young artists and supports them when entering the labor market. StopMoLab is a period of intense work and learning under the watchful eye of world-class specialists and professionals who are associated with such productions as *Corpse Bride* or *The Red Turtle*. The project fills the natural gap between education in art schools and the realities of functioning in the today's animation industry. SKILLS, BUSINESS and GO GREEN are the three keywords and, at the same time, they are the modules that define the program. Improving skills and discovering new trends, business models, ecological best practices are the key directions in the animation industry's development.

StopMoLab was created for animators, puppet makers, scriptwriters, production managers, and art directors. A big part of the program is to increase the mobility of the participants and build relationships between masters and students at the international level. The European scale of the project is unique, and that's why the European Union took notice of it and granted it funding from the Creative Europe Media program.

Sections The SKILLS and BUSINESS sections were created for knowledge transfer between masters and those who are beginning their journey in animation. The GREEN section, on the other hand, discusses and explores of green solutions for stop motion animation. The result is the world's first guide for green production that you are holding in your hands right now.

Enjoy and make the world greener!  
Paulina & Ola.

**Birgit Heidsiek,**  
Author, Writer



**Anika Kruse,**  
Author, Writer



Green film production is the efficient use of energy and resources, and it applies to live-action as well as stop-motion animated films. As *Green Film Shooting* experts, we were delighted to be given the opportunity to create a sustainable stop-motion animation curriculum for the StopMoLab. At the Green StopMoLab Seminar, we provided writers, directors, puppet makers, art directors, and producers throughout the world with eco-conscious approaches to film production.

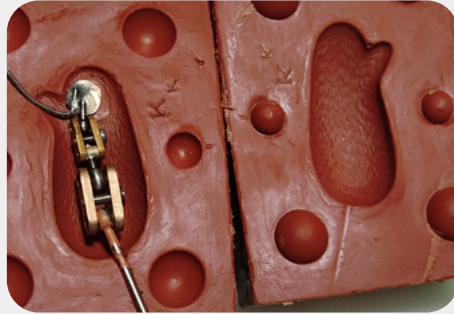
At our final green seminar session at the Animarkt Stop Motion Forum in Lodz, we developed, in collaboration with our participants, minimum ecological best practice standards for studios, production companies, freelancers, and students that we outlined in the StopMoLab Green Guide. It focuses on the selection of materials because hazardous substances used in synthetic textures, paint, and glue for stop-motion animation are harmful to human health as well as to the environment.

Seminar participants from Mexico developed an eco-friendly bioplastic for stop-motion animated films, which is even edible. Furthermore, we had the honor to welcome stop-motion animation stars at our seminar: Art Director Francesca Berlingieri Maxwell; puppet maker Andy Gent; award-winning filmmaker Francesca Nobili; and producer Massimo Casula. Their inspiring techniques and best practices also form part of the StopMoLab Green Guide. Sustainability is always a process.

So, let's start implementing the minimum ecological standards in stop-motion animated productions.  
Birgit & Anika

# MINIMUM STANDARDS

## Material



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**Green procurement: Purchase non-toxic materials.** Many adhesives and chemicals used in a stop-motion production are toxic. If an alternative is available on the market that works just as well, it must be used. Use paper tape and glue made of corn flower.

**Use locally sourced materials** and research where they may be obtained. The studio staff needs to be aware of the lifecycle of products and materials or, at least, have access to information about their sourcing and how they will be disposed of at the end of their life span. At least ten percent of the materials used for production need to be locally sourced.

**Use natural, biodegradable, and vegan materials.** Natural sponge should be replaced by vegan foam. Check out alternative materials like bamboo, which is stable and fast growing. Use wood, paper, cardboard, metal, and fabric for clothing, and bioplastic made from cactus for 3D printing.

**Purchase used materials.** At least ten percent of the materials for production need to be recycled materials. Reuse sculptural armatures as well as their component parts.

## Set Design



© Kike Ortega/Pajarones

**Think from the design stage.** Adapt to the kind of materials that are readily available. If necessary, build the set three percent smaller, if needed, so that no new material needs to be purchased.

**Make designs modular.** Use different modular parts and combine them to create sets. Work with standardized shapes or attach extensions to make the set element larger. Reuse the inside and outside of materials (i.e., of a cube).

**Reduce the amount of materials used.** Use wood only for an outer shell, so that the resulting hollow form is lighter.

**Avoid nails and screws.** Adopt the Japanese mortice and tenon technique for joining wood.

**Avoid mixing different materials.** If the material in question is homogenous, it may be reused. Do your research; share your knowledge.

## Waste Management



© Lynn Greyling/Pixabay

**Reuse set elements.** Save metal from armatures. Donate used armatures to storage facilities.

**Communicate with colleagues and companies.** If there are surplus unused materials after production wraps, then let the creatives and studios in your town or country know about the leftover materials.

**Create a storage system.** Every studio should have a storage system to provide a longer shelf life for each product. Attach a form or document with information on the shelf life of the product.

**Create different bins for disposable waste.** Stop-motion productions often use toxic liquids. Create and label different waste bins for correct waste management of hazardous materials.

**Agree on consistent color coding for different waste bins.** This requirement needs to be introduced throughout the stop-motion industry. This is easy, and it helps avoid confusion.

## Catering



© Isabella Dornbrach/Pixabay

**Purchase locally grown seasonal food.** Buy food from your region. Give preference to organic and fair-trade products. Avoid processed food, which contains byproducts and comes with a bigger carbon footprint.

**Avoid single-use packaging.** Choose reusable food packaging options, such as glass.

**Avoid food waste.** Don't order more food than is necessary. If there are any leftovers, then separate the food waste and dispose of it in the organic bin.

**Always offer a vegan option.** If the staff is amenable, a meatless day may also be introduced.

**Provide filtered tap water.** Every studio should offer filtered tap water, which any staff member may refill as needed.

## Transportation & Mobility



© wal 172619/Pixabay

**Bicycle or walk to the studio.** Walking or classic bicycling (as opposed to electric biking) to work will avoid carbon emissions.

**Provide bicycle stands for the staff.** Secure bicycle parking stands will encourage staff members to ride a bicycle to work.

**Use public transportation.** For longer hauls, public transportation (bus or train) should be used. If going by car is only the option, then carpooling will reduce the carbon footprint.

**Avoid traveling by airplane.** Traveling by airplane causes more carbon emissions than traveling by train, bus, and car.

**Switch to virtual conference calls.** Avoid long-distance business trips for short meetings.

## Energy



© Birgit Heidsiek

**Use LED lighting.** LED lights are more energy-efficient because they consume up to seventy percent less energy and need less cooling than incandescent lights.

**Manage energy carefully.** Studios should install motion sensors so that lights will be automatically switched off in an unused room.

**Use locally generated renewable energy.** Studios should install solar panels on the roof, if possible. At minimum, a contract with a renewable energy provider is mandatory.

**Heating and cooling with renewables.** The building should be heated with renewable energy, i.e., solar thermal energy or geothermal energy.

**Cut energy consumption by using human resources.** Instead of using machines with high rates of energy consumption, use manual labor on set. This has a social impact because it creates jobs.

## Water management



© magics-cube/Pixabay

**Water-saving flush toilet:** Studios should install a reduced water-supply button for flush toilets.

**Avoid wasting water:** Restroom faucets should be equipped with diffusers so that less water goes down the drain. Motion sensors should be used on faucets to provide water only when motion has been detected.

**Check faucets:** A dripping faucet leads to continual water wastage and added costs. Make sure that faucets close properly.

**Careful water management:** Please advise the staff to carefully manage the use of water. It shouldn't go down the drain purposelessly.

## Health



© Birgit Heidsiek

**Provide safety instruction.** Communicate how and when the use of respirators and gloves is mandatory. When working with toxic materials, provide information on the different safety levels of respirators and gloves.

**Label toxic materials clearly.** If toxic materials are used, then they must be properly labeled with a list of their ingredients.

**Safety by contract.** Studios should include health care and on-the-job safety measures in the employment contract.

**Health care for employees.** Studios should check the health of employees upon hiring and provide health insurance.



# Viviane Peoc'h

## Art Director, Animator and Puppet Maker, UK.

Viviane has a professional background in theater, puppetry and storytelling. After four years of experience in set, props, modeling, and puppet design and making, she specialized in stop-motion.



## "I wanted to produce a film with minimum environment impact."

Her student film *Grandma a True Story* has been screened in various festivals around the world, and it received four awards as well as a nomination for a Breakthrough at the Bafta Cymru 2017.



© Viviane Peoc'h

In *Grandma, a True Story*, a miracle is on the way

"The first commissioned animated film I made was *Pobol*, which is the Welsh expression for 'People'. For this stop-motion animated documentary, real people were interviewed and then recreated as puppets. It is an invigorating and inventive portrayal of the past through the eyes of the local people of Bangor City in Wales! Life was full of challenges in the Seventies! How much fun they had when they were young!"

"Due to the tight budget and schedule, my experience in theatre led me to create the set in 2D. Black and white historical photographs of the town from the 1970s were printed and positioned in layers to create the illusion of depth. The 2D set reflected the past that the characters had talked about in their interviews. This way, I avoided having to build all the streets, houses, and trees in 3D, which saved resources. The models were made of natural fibers. Three were made of felt, and three were crocheted. A lady was commissioned to knit three faces and hands. Wool was used to create hair, while the outfits were adapted from old baby clothing that had been sized down. The shoes were made from jute potato sacks."



© Viviane Peoc'h

For *Pobol*, real people were interviewed before they were recreated as puppets

In the animated stop-motion short film *Zoe & Sununú*, a twelve-year-old girl travels with her pangolin between two worlds in search of her parents. For this production, all the models were created with natural materials, such as leather, while the outfits were made of wool. The sets and models were made with 2D prints, but they become 3D when the twelve-year-old protagonist leaves the 'World at War' and enters the 'World at Peace', which was built as a 2D-layered in-depth set. The final scene, which takes place in 'The City of the Future', was the only one constructed in 3D.

"I wanted to produce a film with minimum environment impact by creating 2D rather than 3D sets. That was an artistic choice because of the story, which is about to spreading awareness about the consequences of global warming."

"From my experience in theatre, where wasting entire sets and props is systemic, I promised myself that I would build the sets with the idea of keeping and reusing materials, which implies future investment in a warehouse where production, storage, and recycling spaces would be created. It would turn waste material into creative resources."

<https://vimeo.com/breizhellyl>



# Braulio Rodriguez

## Producer, Director and Screenwriter, Venezuela

*His award-winning animated short stop-motion film No Stingray Pie Tonight premiered at The Short Film Corner at the 2011 Cannes Film Festival and was presented at festivals in Montreal, Guadalajara, Cartagena, Habana, and Caracas.*



**“I will develop a tutorial that will permit children to create characters. It will be fun and leave them with fond memories.”**

In the five-minute stop-motion film, a fisherman chases Chucho the stingray in an intense underwater pursuit, which suddenly stops when both are buried by garbage dumped by a passing ship. This experience forces the fisherman to reflect on the pollution of the ocean that provides his living.



*A fisherman faces ocean pollution*

© Braulio Rodriguez

The next step is to produce the eco-conscious story as a sustainable film production. The remake of *No Stingray Pie Tonight / Hoy no se hace pastel de Chucho* will be made in a maximally sustainable production that will create a positive global perception.



© Braulio Rodriguez

*Sets for the stop-motion animated remake will be made from waste material*

The puppets and sets will be constructed from flotsam and jetsam that washes up on beaches, and the birds will be created by using the feathers of birds that had died from exposure to oceanic pollution. The water will also be a character, created by painting with light, and this technique may be used to create the surface of the sea as well as the sky.

The music will be produced in an analog studio using a green process. Production will be designed in a coastal area.

<https://vimeo.com/brauliorodriguez>

# Alexandra Lerner

Freelance illustrator and animator, Germany.

Graduated with a bachelor's degree in Design from Nuremberg Institute of Technology where she studied Film & Animation as well as Illustration and Graphic Design.



**"I think the biggest problem is the potential wastefulness of stop-motion productions."**

"Our thesis film *Freak of Nature* had no budget, so we worked with recycled materials, trash, and objects found in nature.



© Alexandra Lerner

The circus tent and trailer were made from paper and pizza boxes

For example, I made the puppet's body by using foam from a discarded mattress, and I made the claws on the hands and feet from plastic straws.

I used one of those plastic straws inside the removable head instead of rubber tubing, which allowed me to attach a wire to the neck. It remained flexible and easy to animate. For the set, I built a miniature tent, circus trailers, and cage out of pizza boxes and paper that was left over from bigger set pieces.

We collected twigs to use as trees and cut blocks of moss to create bushes as well as the ground surface of the set."



© Alexandra Lerner

Freak of Nature was produced with recycled materials

"There are a lot of challenges in making stop-motion films. It is of course expensive and time-consuming compared to CG animated films, but I think the biggest problem is the potential wastefulness of stop-motion productions. You need a lot of energy over a long period of time; artists need to travel to the production location; and large amounts of toxic materials are used to create puppets and sets, which will never be used again. So, it is important to take responsibility and make the adjustments."

<https://alexandralerner.de/>

# Berna Yildiz

## Puppet Maker and Set Designer, Turkey

Berna is an animation filmmaker based in Istanbul with a BFA in Scenography, Costume Design, and Puppetry. She participated in training programs such as StopMo-Lab, Animist Animation Directing Program, and various workshops. Currently, she is working as a freelance stop-motion artist and developing projects.

**“There are lots of creative ways to find sustainable solutions. I try to reuse materials for my films in order to have greener solutions.”**



© Emre Oktas/ Oktabi Atelier Prop House, Turkey

*This compactor was designed to compress cans before smelting*

An example is from Oktabi Atelier. Prop designer Emre Oktas collected soft-drink cans. He designed a machine to compress the cans for smelting. Later, the metal can be smelted with aluminum to cast prop swords for TV productions. He also used plastic waste to create filament for 3D printers.

“As an artist, I try to reuse materials as much as possible. The brick-textured plaster wall we made at the Mielenero Animation Studio was repainted for use in another production. With some extra lights and details, the wall looked brand new.”



© Giacomo Giurato & Martina Tondi/ Mielenero Animation Studio, Italy



*The plaster wall with brick texturing was repainted for another use*

<https://linktr.ee/bernayildiz>



# Maryana Rudakova

## Stop-motion animator, director, Poland

Marianna has extensive experience in shooting commercials and explainers for products and brands. She cooperates with advertising agencies and film studios. Having a specialization in claymation and papercut she leads the animation from the very beginning to the end, from the storyboard and visual ideas to editing and sound effects. She is also working as a mentor and helps her students on their path in stop motion.

Many things people throw away, and I say „It has a potential!” and put it on my shelf.

**“My solution is to use as little as possible, refuse something each day, or use less.”**



© Maryana Rudakova

The clay is collected in a box

“I work with clay in my stop-motion productions. I never throw it out; instead, I always keep it in a separate box. I have a rolling machine that mixes colors faster. And it rolls the clay into thin layers so that I can remove dust and dirt particles, which makes it as good as new.”

“Eco-green life is important for me! My solution is: given that there are eight billion people on the planet, suppose each of them doesn’t shut off the water while cleaning their toothbrushes; suppose each of them buys water in a plastic bottle that day, suppose... and so on and so forth.



© Maryana Rudakova

Clay used in stop-motion productions can be reused



© Maryana Rudakova

The rolling machine mixes colors faster

“My solution is to use as little as possible, refuse something each day, or use less. And, of course, I choose alternative transportation: bicycle, bus, metro, and walking.”

<https://www.behance.net/kniknistudio>

# The breakfast of animators

## Bioplastic developed from cactus resin has applications in stop-motion animation

**Arturo Tornero Aceves,**  
Screenwriter/ Director, Mexico

**Nabí Orozco Torres,**  
Puppet Maker, Mexico

*The stop-motion animation filmmakers - Arturo Tornero Aceves, who wrote and directed the animated short Monarca, and Nabí Orozco Torres, who was an animator for the short stop motion animated film House of Memory by Sofía Rosales — are working with chemical engineer Sandra Pascoe Ortiz to create a biodegradable alternative to plastic that can replace silicone in stop-motion animation production.*



**“It feels like ratatouille. And we can cook it up scientifically in a laboratory.”**

As a research professor at the Universidad del Valle de Atemajac in Guadalajara, Sandra Pascoe Ortiz has been experimenting with some species of nopal, a native Mexican plant, to develop a non-toxic, renewable material made from cactus resin, which is extracted and then mixed with glycerin, proteins, and natural waxes. Unlike the production of traditional plastics, which are petroleum based, bioplastic extracted from cactus is renewable as well as carbon neutral.



Cactus resin is a renewable material

© Arturo Tornero/ Nabí Orozco

The Mexican Institute of Industrial Property awarded this new eco-friendly material with its first IMPI Mexican Invention Award. The goal was to develop a biodegradable alternative to plastic for common products: bags, single-use cutlery, packaging, coatings, and toys.

This promising invention caught the attention of the filmmakers, who also teach at the university in Guadalajara. They started experimenting with this bioplastic. During the initial tests, the material shrank and turned into waste water. After conducting more than fifty experimental trials, the researchers figured out which ingredients to use to reduce shrinkage. “The shrink ratio is about three to eight percent”, explains Nabí Orozco. “Therefore, the final dimensions have to be upscaled by as much.”



© Arturo Tornero/ Nabí Orozco

This cactus resin was developed by researcher Professor Sandra Pascoe Ortiz

Nabí Orozco considers cactus resin to be useful for stop-motion animation production because it can be easily cut with a knife, just as silicone, but it can also be stripped out of an armature. “We can recycle the armature”, adds Arturo Tornero. “All of the material disappears in a month’s time in water or compost—and it can even be eaten! ‘Cactus jelly’ tastes good, and it’s a little spicy—the breakfast of animators!” The team also experimented with color. “Our puppet was colored with curcuma and cacao. We want to keep this product vegan so that it would be compostable.”

The original color resembled that of green tea. It's possible to achieve a translucent look, but it always has a green cast. The team tried coloring it with pigments. "It works with everything, and the colors are bright, but we want to try coloring it with organic pigments", says Arturo Tornero. "There is still a lot of experimentation to do because we want to develop a non-translucent substitute."

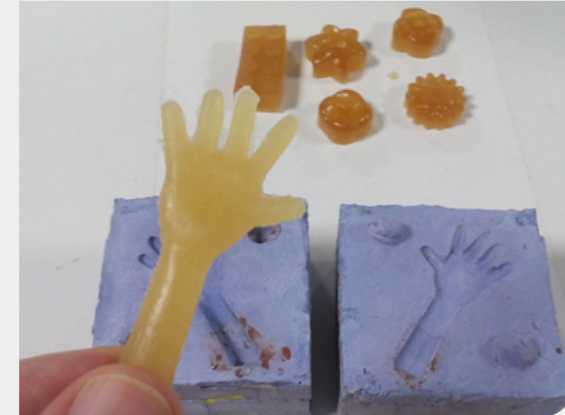


© Birgit Heidelekt

*The filmmakers tried using pigments to color the material*

As with any new material, the scientist and the filmmakers still need to invest time in its development and to test applications. This material is more complicated than inorganic chemical ones, because it has more limitations. This organic thermoplastic resin melts in water at 70 degrees Celsius. After the material is heated, it must be injected into a mold within fifteen minutes.

In order to avoid bubbles, the material, just like silicone, can be placed in a vacuum chamber. After two hours of refrigeration, it stabilizes. "This material can also be used in a 3D printer, but this requires another operation", Nabí Orozco points out. "This material takes three times longer than silicone to work with. But once that is done, you can reuse it."



© Arturo Tornero/ Nabí Orozco

*It's possible to create translucent cactus material*

"It feels like ratatouille. And we can cook it up scientifically in a laboratory. It's a great achievement, because we want to use alternative materials in animation", says Arturo Tornero. "We want to use it to make a short film", concludes Nabí Orozco. Since the source material is cactus, which grows on nearby plantations, it is sustainable and has a locally sourced supply chain.

"It works for small productions, but there are limitations for its use in an industrial process. "If a film company were to order fifty kilograms, we wouldn't be able to fulfill the order because we don't have the infrastructure to produce on that scale." So far, there is no investment in its development because producers are still skeptical of this new material, largely on account of its limitations. Nevertheless, scientist Sandra Pascoe Ortiz, the filmmakers, and the university applied for a patent, which is pending.

<https://vimeo.com/arcrx>

<https://navikov.artstation.com>



# Safety first

## Francesca Berlingieri Maxwell, Art Director

Francesca Berlingieri Maxwell's background in fine arts and theatre inspired her to work as an art director and production designer in stop-motion animation. She worked as a painter and model maker on Aardman Animation's *Chicken Run*; as head painter on Tim Burton's movie *The Corpse Bride*; and as art director on Wes Anderson's *Fantastic Mr. Fox* and *Laika's ParaNorman*. She also teaches design in animation in the UK and around the world.



**„We are responsible for maintaining safety equipment as well as the storing of toxic materials, even though we prioritize the use of non-hazardous materials.“**

### How is an art department managed?

In film, the production designer, the art director and the workshop supervisor run the art department, or in smaller productions the art director and the production manager. We have been trained in health and safety procedures used in the workshop. This includes extraction and ventilation, and properly lighting workstations, which is important for people who work long hours mostly in the dark. We are responsible for maintaining safety equipment as well as storing of toxic materials, even though we prioritize the use of non-hazardous materials. That is an important aspect of our job.

### How have theatre and painting influenced your work in stop-motion animation?

When I worked at the National Theatre in the UK, the head of the painting department was very keen on using environmentally friendly materials. She researched the paint, sprays, textures, and glues that we were using and was always pushing us to use safer alternative materials and tools.

A safety data sheet is available online for each material we use. It contains ecological, transportation, and disposal information. If it is not up to date, it is then necessary to call the suppliers and revise the information. Paint producers will tell you where the raw materials come from, how they are transported, and how to properly handle and dispose of them.

### Was it similar in stop-motion animation?

My first project in stop-motion animation was *Chicken Run*, which was about a farm chicken. The chickens used everything on the farm to make their lives more comfortable. We researched farms in the 1950s in the UK, and we adapted them for the film. The company we were working for was linked to Aardman, which was not building its own animation sets at the time. An outside company built all the sets. Safety came first for the crews that worked there every day. We relied on materials that could be reused and recycled. Twenty years ago, there wasn't much ecological awareness in the industry, so there was not much pressure to find green solutions. I introduced Rosco paint and other materials we used in the theatre, where we extensively use recyclable materials because they are cheap, easy to use, and often lightweight.



© DreamWorks Pictures.

Many props in *Chicken Run* were made of reused materials

### What kind of materials did you actually use?

We used a lot of "rubbish" when we made the props for this film. For example, we used rubber chips from old tires cut into small pieces. It makes a great texture for stop-motion animation. We could not avoid using many hazardous materials, i.e., glue and silicone, for molds. We were trying out different things when we were starting off. We used wood chips, cotton towels for grass, and natural material as much as possible. We used recycled sewer piping and electric cables, for example. We still use MDF for most of the set building, unfortunately. An environmental alternative would be good to have.

### What new materials did you discover?

When I was working on *The Corpse Bride*, I was introduced to Fillite, which is a clay powder used in other industries for making large molds. It comes in twenty-kilo sacks, and it is cheap, easy to store, and you can mix it with water-based paint. It's easy to sand and paint, and it creates a wonderful surface. It's not hazardous, but it still creates silicone dust, so we have to wear dust masks whenever we spray it or sand it. All the sets and props on *The Corpse Bride* were covered with Fillite because Tim Burton wanted the film to look like an illustration from a book that was emerging into three-dimensions. It has this wonderful matte finish; it's a great color; and it takes paint very well. You can mix it with wood chips and sand to give it even more texture. It creates wonderful effects.



© DreamWorks Pictures.

The flying machine used in the Aardman production *Chicken Run*

### What challenges does an art director in stop-motion animation face?

For all stop-motion animated films, an art director has first to take the health and safety of the crew into consideration, and then the budget and timeline. There are paints, dyes, and inks, for example, that either have more natural ingredients or use organic ingredients. Many other materials may be used to create textures as well as for constructing sets and props. We convinced the producer that reusing many materials was good for our budget.

You have to consider the aesthetic continuity of the film. You have to make sure that the materials you are using produce the right look for the design. Also, they have to be strong and stable; the set and its component elements must not move during shooting.

Once these things go into a landfill they still damage the environment. As art directors, we have to keep an eye on this. You try to improve your materials with every new production.

### What eco-friendly materials did you use on other productions?

For *Fantastic Mister Fox* we used paper flowers and tea leaves for tree foliage. We used wool and cotton towels for the landscapes. We also started using wax and other more natural ingredients on our sets.

**„You have to make sure that the materials you are using produce the right look for the design.“**

For *ParaNorman* I used chicken wire and tissue paper that had been dyed and stiffened with PVA. Then we cut and glued it on the trees. All the forest trees were made of cardboard, and the leaves on the ground were made of paper. Since we had to build more than 600 trees, we inevitably had to make molds for the background trees. One of the big challenges I had to face on this film was to try and reuse the trees and all other elements from set to set, so the shooting time was crucial.



© Property of Fantastic Mr. Fox Productions

The chemistry lab in *The Fantastic Mr. Fox*

### Did you intend to make the texture visible on screen?

I really like to see all the elements that compose a set. I don't always want to conceal our use of cardboard, wire, fabric, or rope. I think it's fantastic when we can

see it, because it shows that our sets are manmade, and it displays the amazing work our craftsmen do. It makes you see the many alternatives to what we first imagined possible. We can use everything around us and in our daily life or in different industries, many things are available to us. And this opens up a new line of investigation. Our imagination helps us integrate sustainable and environmentally friendly materials into our work.



A tree test for the production of The Fantastic Mr. Fox

### Do you teach this approach at stop-motion animation workshops?

In film school we recycle because we are working with small budgets. We use a lot of polystyrene in making sets and props and in the camera department, but we recycle it too. We are always going into our skips and reusing discarded things. Or we can find insulation foams on the street or in builders depots. These are not environmentally friendly materials, but we are reusing them. We recycle as much as possible.

### What kind of restrictions do you deal with?

We work with designers and directors who are visionaries. Tim Burton was a designer before he became a director. Wes Anderson is very interested in design, and his visual imagery is strong.

Visionaries who work in stop-motion animation have a clear aesthetic style. Examples that come to mind are *Pinocchio* by Guillermo del Toro, and *The Corpse Bride*, which Tim Burton wanted to resemble book illustrations. Wes Anderson restricted his color palette when we worked on *Fantastic Mister Fox*. We weren't allowed to use any cool colors, such as blue or green, so we had to work with orange, pink, and yellow.



The apple tree hill in The Fantastic Mr. Fox

For *Chicken Run*, however, we created a realistic world. The chickens were unreal, but our sets were well-research, and they did look real.

*ParaNorman* is about a boy who is a misfit because he can see ghosts and speak to zombies, so the directors and designer decided to create a visual language to express that. For example there are no parallel lines in the film.



The zombies in ParaNorman were made of paper

### How difficult is it to meet these challenges?

There are restrictions, but they force you to become more creative. It's the same with using environmentally friendly material that forces you to find different solutions, different possibilities. It's a challenge that makes the job more interesting.



### Can the puppets and sets in bigger studios be reused or recycled?

A few of the puppets and sets are used for exhibitions after production has been completed. A museum in Los Angeles stores a lot of these sets. But we make about a hundred sets for each film. I try to recycle and reuse the components parts while shooting, but most of the set elements get thrown away. The puppets are very expensive and precious. They are kept but each film has a different design and a different look, so every element and every character has to be newly made for each production.



*The trees in the cemetery scene in ParaNorman were made from cardboard*

© 2012 Laika Inc.

### How can that be avoided?

Aardman is able to reuse all its elements because they use the same look for all their films. They have to rebuild some houses and trees from time to time, but they have a large storage space where they keep all the elements, so they can recycle and reuse these elements as needed. Another advantage is that they always build on the same scale.

This is possible if the studio is big enough, and if it's willing to put the work into it. Small studios with storage space reuse materials because it is economical. At the end of a production, we try to give away leftover materials that would otherwise be thrown out.

### Reusable materials include:

- Volcanic ash
- Fabrics
- Recycled wool for insulation
- Rubber chips
- Plaster
- Plastic bottles (heated, cut, and painted)
- Paper
- Metal mash
- Wire
- Soya-based ink
- Pigmented paint
- Rice-flower glue
- Casein
- Popcorn



© Francesca Maxwell

### How much freedom do you have in the selection of materials?

An art director has to create samples of all the sets to submit to the director and production designer for approval. So, you make a little maquette, a little model, and then you make samples of all the textures, paint effects, and shapes to be used on the set. When you are doing these tests, you can research the materials to determine the cost, and to see how long it takes to produce these effects. Water-based paints take longer to dry than oil-based ones, for example, and likewise for the glues. You also need to check with the DoP to determine what looks good on camera. The materials have to be solid; the aesthetic look has to go with the design; and it has to be feasible and economical. Then you need to get the approval of the animation team, the director, and the producer. Furthermore, you have to make sure that you can repurchase these materials because the production can last one or two years.

### Can you always work with the materials you prefer?

Not always. Once I worked on a film that required a lot of wood textures. One of the directors insisted on using balsa wood, which is a lightweight hardwood, so in my opinion it should not be used on big productions, particularly when it was possible to recreate the look with more sustainable materials.

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# Creativity is all about sharing!

## Francesca Nobili, Art Director, USA

Francesca Nobili, a senior creative for advertising agencies and production companies in Europe and the USA, is an award-winning stop-motion animation filmmaker. With her creative lab Circle Entertainment, LLC, she produces stop-motion animated short films.



**„Before I trash anything, I check to see if there’s something about it that gives me an idea for what I’m trying to create.”**

While working as an advertising copywriter and creative director, Francesca Nobili felt that she didn’t have much control of her creativity. Therefore, she decided to buy a camera and learn how to use Final Cut Pro. At first, she started making short projects to promote her client’s work. But then, she reveals, „I had this enlightenment: I don’t need anyone with stop-motion animation.”



Toys escape from their box in *A Tale of a Sassy Little Girl*

She already had lots of material. Instead of buying the perfect prop, she just started looking around to see what she had on hand to create props, characters, and puppets. „Before I trash anything, I check to see if there’s something about it that gives me an idea for what I’m trying to create. Being organized is important. I just collect!” That means even plastic packaging for dental floss. “They can be wheels or cups!” Her Los Angeles apartment is full of storage boxes with found materials.

She has been producing animated short films for nearly a decade. Her short film *A Tale of a Sassy Little Girl* won more than a dozen awards. Her approach is to find materials so that she can turn „something into something else”. When she created an animated rat, she made the body from an ear-plug, and she used twist ties for the tail.



Ball Wednesday premiered at the Bicycle Film Festival

She has plenty in her kitchen, because she gets them every time when she goes food shopping. „It’s all about being organized. The moment you have an idea, you want to find that piece immediately.” In these situations, she just goes through her storage boxes and eventually she finds a piece that she has forgotten about that inspires her.



*A Tale of a Sassy Little Girl* is about a Halloween nightmare

For the animated films that she presents on her Circle Entertainment, LLC, platform, she developed her own shooting technique. „It’s freedom. It’s magic. I don’t have any rules!” She loves to experiment with new materials. „I started animating foodstuffs, which was really fun. Then I tried clay.”

Now she is preoccupied with wood and fabrics, because it is real. It's not a drawing, and it's not CGI. „Even my special effects are what-you-see-is-what-you-get.“ She combines stop-motion animation with live-action animation, which is helpful for certain special effects. For a horror music video, for instance, she burned a piece of the set so that there were real live-action flames.



© Francesca Nobili

The award-winning short Western film *Guacamole* was shot in one day



© Francesca Nobili

*Guacamole* used stop-motion animated vegetables

Everyday life inspires her, even when she's walking her dog. „If I see something on the ground that inspires me, I pick it up.“ Francesca Nobili treats this as an exercise, because „we aren't used to thinking this way.“ When she needs something that she can't buy, she tries to find a work-around.

„It is a fun process. Anything can be animated. Like I did with food.“ While she was working on her stop-motion animated short film *Guacamole*, she spent hours in the supermarket searching for the perfect tomato. People were looking at her suspiciously, so she simply replied: „Don't look at me. I'm just looking for a tomato I can animate.“



© Francesca Nobili

Unexpected visitors in *A Tale of a Sassy Little Girl*

And of course, the most eco-friendly approach is to reuse materials for props and puppets. It's embedded in Francesca Nobili's DNA. And her approach inspires other artists. „Creativity is all about sharing! We need a platform where we can share techniques and materials“ emphasizes the filmmaker. Furthermore, it is helpful to produce short clips that demonstrate a special technique. „Knowing these little tricks can trigger a chain reaction. It is all about passion and inspiring one another.“

<https://www.francescanobili.com/stop-motion-animation>



# It's all about communication

## Kike Ortega, Director, Chile

*His career as director of stop-motion animated films started with the short film Bajo la luna. The TV series he directed include Puerto Papel, Zander, and most recently Pajarones.*

**"It's best to have eco-friendliness in mind to use resources efficiently – and not the other way around, to have this idea in mind and then get the resources to make it."**

### What does it take to make an eco-friendly stop-motion animated film?

First, pay attention. Make sure the whole team pays attention to what is being used, what is being wasted, and how the production can be done in an eco-friendlier way. It's important to have fluid communication with every member of your team, from junior to senior members of the staff. This way, everyone is aware of what is being used, what is being wasted, and how improvements can be made.



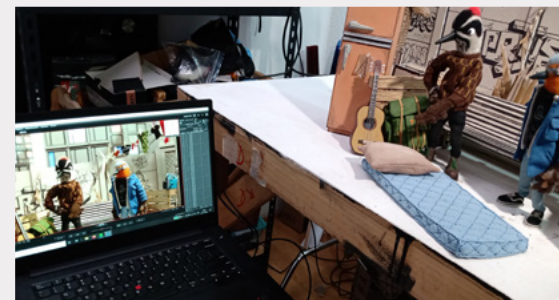
*The set for the stop-motion animated film Pajarones*

On the other hand, it's important to have an eco-friendly mindset from the moment the project is conceived. Every project has an idea, message, or story to tell, and there are many ways to tell it. It's best to have eco-friendliness in mind to use resources efficiently – and not the other way around, to have this idea in mind and

then get the resources to make it. A more sustainable approach is to be aware of the available resources and to use an eco-friendly methodology. I start there and come up with an idea of what I can make with it.



*The team used resources for the production that were already available*



*As in theatre, only one set was used, but dressed differently*

### Does this approach work in practice?

Yes. We had this experience with a series that was hit by the pandemic when we were starting, and we had to adapt. And there was another series called *Pajarones*, where we rose to the challenge and overcame obstacles. The first obstacle was money, because we had applied for funding from the Chilean web series fund, a government fund for the arts. The grant was low, about \$31,000, but we decided to make thirty minutes of stop-motion animation, which is a lot of screen time for such a small amount of money. But we did it in a responsible manner and managed it well. We set out with those obstacles in mind: this is what we have; these are the builder blocks; so, let's work with what we've got.

### Does this require a certain kind of style?

We thought about theatre, which uses only one set that can be dressed differently. This was one artistic decision we made for the series. We talked with the art director, who was enthusiastic about it because she had been trained as a theatre designer. With only two animated characters, we simplified the process of lip synching. The rest was posing.

Even the direction of the animation was simplified with a lot of pose-to-pose set ups. We managed to shoot this in three months. That meant one episode per week and a half, and each episode was approximately three minutes long. We had to produce an average of thirty seconds of animation per day.



© Kike Ortega/Pajarones

*This set was designed with cardboard, wood, and recycled materials*

### How did you manage to work so quickly and efficiently?

I am proud because we minimized waste, since we were working in a very small space. Transportation was reduced to a minimum because we traveled by bicycle. The set was made of cardboard, wood, and recycled material. So, we managed to reduce materials use for the whole production: screenwriting, shooting, audio recording, and post-production.

We are just as proud of our work methods as we are of the series itself. Team members felt empowered because part of the creative process was using materials more efficiently and wasting less.



© Kike Ortega/Pajarones

*Lip synching was simplified by using only three mouths*

### Is this a model that can be applied to other productions?

We created a template that can be reproduced and adapted to any kind of production. Eco-friendly thinking always leads to eco-friendly materials and processes, and it results in an eco-friendly system. This will be our next goal, and I think we will achieve it.

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# The potential of sustainable screenwriting

## Jessica Wheeler, freelance artist and producer

In 2018 Jessica Wheeler participated as a director of stop-motion animation training seminar at the ANIMARKT Stop Motion Forum in Lodz, Poland. Her stop-motion shorts include *Euphorbia* (2017) and *Growing Plains* (2021). She produced the animated short *Jaybirds* (2019), *La Vita Olistica* (2021), *Forest Coal Pit* (2021), and is currently producing *Two Black Boys in Paradise*.



„Green storytelling has the potential to open a range of interesting images and expressions that are related to our world and how we view it.”



The stop-motion animated short film *Growing Plains*

### What is your approach to sustainable screenwriting?

My approach draws on images of the uncanny and avoids didactic language around climate urgency by using a speculative narrative fiction.

*Growing Plains* asks questions through image, texture, and sound design about the symbiosis of humans and the natural world. Dialogue is avoided.

I wanted to paint quite an extreme speculative portrait where humans have an alternative biology. These uncanny images might not immediately change minds, but I hope they deter apathy. They might lead to engaged conversations.

I certainly don't take a prescriptive approach to sustainable screenwriting. Just as each animation project may require a different technique, each project may likewise require a different means of sustainable storytelling. It's not always conscious, but sustainability often weaves its way into my films, whether it's a choice of character or materials.



*Growing Plains*: Green storytelling meets green production

### What potential does green storytelling offer stop-motion animated films?

I'd probably first ask: what potential does stop-motion animation offer green storytelling? Thinking about planet placement and the ways in which film and television writers are trying to normalise sustainable activity, stop motion has the unique advantage of creating limitless worlds and images. If you can imagine it, you can probably animate it. The challenge comes with communication, the ability to engage people's emotions, and the creation of stories that provide an embodied experience.

Let's think about the positive impact stop-motion films make. Green storytelling has the potential to open a range of interesting images and expressions that are related to our world and how we view it. Green storytelling, like off-screen discussions about climate change, does not exist in isolation, but is instead motivated by the social and political questions that we continue to face.

### Does an eco-conscious story also require the use of environmentally friendly materials in a stop-motion production?

It doesn't require it, but if you're telling an eco-conscious story, and you're not thinking about the materials you're using, then it might be worthwhile to ask yourself why you are telling this story....

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## A circular-economy model for film productions

### Massimo Casùla

The founder of the Cagliari-based production company Zena Film, the Italian producer Massimo Casùla, is producing films in various formats and lengths, among them: the 2D animated film *Nausicaa – L'altra Odissea* (2017); the short film *A Girls* (2021); and the documentary *The Miracle of Sinners* (2021). In 2022 Massimo Casùla completed his company's first stop-motion animated short film *Blue*. In 2015, he participated in the *Heroes 20.20.20* project in Sardinia, where he learned green protocols and how to apply to animation and live action shorts.



**“We were able to replace environmentally harmful materials step by step. Researching more eco-friendly materials was a very long process.”**



A village was created for the stop-motion animated film *Blue*

For Massimo Casùla, a basic requirement was to produce *Blue* in an eco-friendly way. “The Green Protocol of the Sardegna Film Commission supports only films that are produced sustainably”, says the producer. “In Sardinia this is the only way to get public funding for a film project.” Thanks to green production experience garnered from his other films, he was able to apply best practices to the production of *Blue*. During pre-production, the film crew was searching for eco-friendly materials for set construction. They carpooled and they used e-bikes powered by solar energy.

“We worked with one single set at a time so that we could keep the crew size to a minimum”, says Massimo Casùla. While the director, the set designer, and the cameraman were on set, the character designer remained in Spain, and the costume designer for the puppets stayed in Germany.

The set in Cagliari was located in a former tobacco factory that was provided by the Sardegna Film Commission as part of the New Animation in Sardegna (NAS) program. A circular economy model is key to the functions of this refurbished building where the Sardegna Film Commission has created the public training and production lab in 2D, which runs 24/7 with shared equipment and space for more than 80 animators. This set up guarantees a very efficient system.



*Blue* tells a story about angels and souls

“We tried to work in the most environmentally friendly way possible”, the producer points out. For the stop-motion animation film *Blue*, the production had to create a village. Directed by Michela Anedda, who returned from Dublin to Sardinia to work in sustainable animation, *Blue* tells a story of angels and souls.

A girl appears when people die in Sardinia, where people live to a very old age. For the village, which was built at a scale of 1:6, the set designer used mostly natural materials. He worked with real bricks and used wood instead of polystyrene, and he used clay only for the roof tops.

“We were able to replace environmentally harmful materials step by step. Researching more eco-friendly materials was a very long process”, emphasizes Massimo Casùla. “Directors often don't understand this process, and they expect the set to be built in a week's time, so they can shoot scenes with 180-degree coverage.”

It is often impossible to find more eco-friendly materials in such a short period of time. "It's a compromise between the director, the animators, and the producer. I am playing the „bad guy“, because I often have to say 'No' — maybe more often than I should." Problems that may occur on a stop-motion animation production are similar to those in live-action films, because both are filmed on real sets. "You need to have a back-up plan in case the director has problems."



© Massimo Casùla/ Zena Film

*Green production was a requirement by the Sardegna Film Commission*



© Massimo Casùla/ Zena Film

*This set was created in a former tobacco factory*

The team worked with a lot of reused fabrics and objects, such as old toys. "When it wasn't possible to go eco-friendly, we tried to minimize the impact, so we used silicone instead of plastic because it's not a petroleum derivative." In order to limit the use of silicone as much as possible, the crew used the same hands for all the puppets. To light the set, the production installed about eight lights for one shot. The older halogen dedolights with 150-watt power consumption were replaced by 55 watt LED lights.

For the cameras the production was using, no macro lenses were available, which would have enabled the creation of a set at a scale smaller than 1:6. "We would have had to change all our optics, and that's very expensive." Since it's impossible to rent equipment for stop-motion animation, production companies and studios have to carefully compare prices. When Massimo Casùla wanted to buy LED lights, the price was very high, so he purchased them directly from the manufacturer. "The equipment that we have is already paid for, so we share it with other productions as a model for the circular economy."



© Massimo Casùla/ Zena Film

*The set designer used bricks and wood instead of polystyrene*



© Massimo Casùla/ Zena Film

*The team used a lot of reused fabrics and objects, such as old toys*

While the production of *Blue*, along with visual effects in post-production, is being successfully completed, Massimo Casùla is developing the company's next stop-motion animated film.

## A sustainable stop-motion studio

### Ilan Urroz, Studio Manager, France

French producer Ilan Urroz is the studio manager of Foliascope, which is producing 2D animation and stop-motion films. Located in the Auvergne-Rhône-Alpes region, Foliascope produced award-winning films such as *The Tower* by Mats Grorud, *No Dogs or Italians Allowed* by Alain Ughetto, and the latest stop-motion film *The Inventor* by U.S. director Jim Capobianco and co-director Pierre-Luc Granjon.

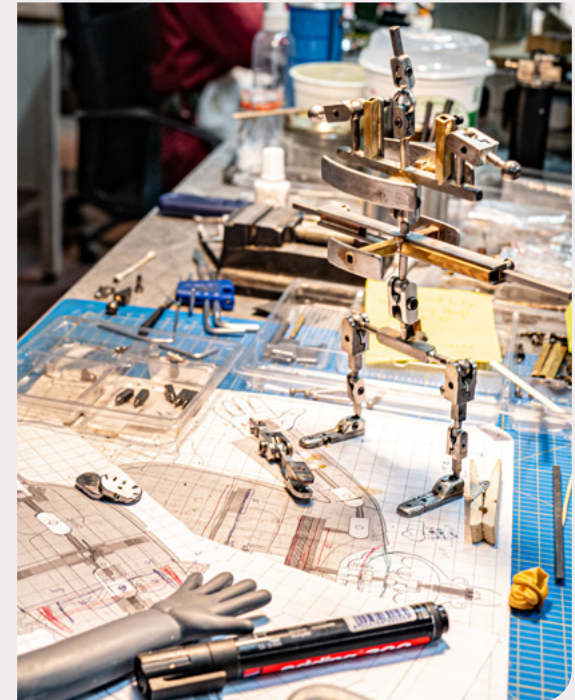
**“I don’t want to waste anymore sets. Artists spend so many hours constructing beautiful sets, so I came up with ideas to give these sets a second life after production wraps.”**



Making of *The Inventor* set

When international talent comes to work at Foliascope Studios, the company provides them with apartments where they can stay for a year or even longer. Ninety percent of the fifty employees on staff travel to the studio by bicycle or bus. Thanks to the excellent public transportation system near Lyon and Valence, international crew members have good connections to the airport and train station.

The efficient use of energy and resources is part of Foliascope’s policy. The team recycled sets from the production of *No Dogs or Italians Allowed* to build a wall on the stage. The studio is for the most part equipped with second-hand furniture. “We don’t spend money on new chairs. We prefer the old stuff.” Foliascope instead invests heavily in employee safety by providing masks, gloves, ventilators, and over-the-ear hearing protectors. The studio complex is heated and cooled by a thermal system with a vacuum pump that uses neither gas nor petroleum.



Armature

Lighting can also have an enormous impact on the temperature inside a building. „In some studios with old-fashioned lighting systems, it can get more than 40 degrees inside”, says Ilan Urroz. But the days when sets got too hot are gone because the studio switched to LED lighting, which consumes less energy and has a longer lifespan. In addition, it offers a broad bandwidth of flicker-free color temperatures, ranging from 3,000 to 6,000 K (Kelvin). Color temperature, the studio manager emphasizes, is important in stop-motion animation. „The light can skew red or yellow. It’s an investment for the future because you don’t waste energy.”



From the artistic point of view, LED lights have several advantages. During the production of *No Dogs or Italians Allowed*, the crew decided that, instead of using polycarbonate foil to generate a reflection on the roof of the set, they developed Sky LEDs that met the requirements of stop-motion animation. Using of Sky LEDs has various advantages. “We can control them via DMX and change the color from 2,700 to 6,500 Kelvin”, says the studio manager. “This is a great evolution in lighting effects.” Moreover, there aren’t any cables on the sets anymore, so there is more space for the set decorator, the animator, and the crew. “All our sets are based in twenty-five square meters.” With the construction of sets and props, it’s always a challenge to fit the design into the available space.”



© Ilan Urroz

*Foliascope prioritizes employee safety with protective gear.*

For *The Inventor* film project, the crew collected drawings by Leonardo da Vinci from the sixteenth century and used them as the basis for building the props. “We partnered with the French software company Dassault Systemes and issued an international challenge for the design of the mechanicals and props in 3D.”

The IT world, which is typically focused on CGI and 3D modeling, was brought together with stop motion. More than 2,000 engineers from all around the world participated in the challenge. In total, five 3D models were designed for props: a boat, a farm wagon, and a cannon. These 3D models were printed with a 3D printer, and then the props were built with wood and metal. “It was an innovative artistic journey.”



© Ilan Urroz



© Ilan Urroz

*Sky LEDs can be controlled via DMX and can change the color from 2,700 to 6,500 Kelvin*

A film featuring a Renaissance castle required building a lot of windows, which were made with wood and the least amount of glue possible. The film crew used locally sourced wood from a company based near Lyon. The windows were designed by using a plotter. The shape of the windows was created in Illustrator and cut directly on paper, cardboard, or wood. For the landscape, the garden with flowers and trees, Foliascope Studios purchased natural dried flowers from a company in Marseille.

The puppets were also built in-house. The first step was to draw the puppets in 2D, but the modeling was done in 3D to fit all the joints, balls, and metal armatures. "When everything has already been created in CGI, it saves time, money, and resources because no latex will be wasted", explains Ilan Urroz.



@ Ilan Urroz

Creating an atmosphere on set with Sky LEDs

Instead of developing a prototype, this method allows the creation of the first in the series of puppets. More than 150 armatures were manufactured for the different shapes of the characters. Thanks to 3D modeling, the crew knew exactly what it was going to have to do.

The next step will be the gymnastic test, which can only be done with the complete puppet. "In the future, we will try to do gymnastic tests for stop-motion with 3D modeling", concludes the producer. "That requires not only engineering for the armatures, but also skills in material application and formation because different materials, such as latex and silicone, are used in puppetry. We will develop this project with our research lab, which was founded by France 2030, and there are many more developments to come!"

<https://www.foliascope.fr/en/home-en/>

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