

Rube Goldberg (1883-1970) was a Pulitzer Prize-winning American cartoonist, inventor, and innovator. Among his many achievements, he is best known for Rube Goldberg Machines,[®] his hilariously over-engineered chain reaction invention cartoons that solve simple problems in the most inefficient way possible.



Rube Goldberg Institute for Innovation & Creativity

An Interview With
Jennifer George,
Chief Creative Officer



The “funny functionality” of Rube Goldberg machines “invites us to think more deeply about machines and mechanized processes, gadgets and technologies, and the very human ways in which we use them.”¹ »

Q. Please introduce yourself and tell us about the Rube Goldberg Institute for Innovation & Creativity.

A. My name is Jennifer George and I'm the Chief Creative Officer at the Rube Goldberg Institute — I also happen to be his granddaughter. The Institute is a not-for-profit that provides free resources and programs to historically underserved young people and communities, using my grandfather's work as a launching point. The Institute promotes equity and access through STEM and art education. From Title I schools in the United States, to scholastically challenged kids in Ukraine, to the poorest townships in Cape Town, South Africa, we reach and empower some of the most vulnerable populations around the world.

The organization was founded in 1988 by George W. George, my father and Rube's son, when we held our first official Rube Goldberg Machine Contest®. Since then, our competitions have flourished, especially thanks to the internet! Today, our contests, based on the chain-reaction whimsy of Rube's invention cartoons, are not just for would-be engineers. Artists can compete



in our Cartoon Contest, coders can compete in Minecraft, and real-life builders have myriad ways to compete! All of our contests are free and in the Fall of 2023, we'll be introducing a digital animation contest in partnership with Unreal Engine and Epic Games. This competition invites digital creators to enter The Rube Goldberg Kitchen, where flying helium eggs, exploding watermelons, and cheese ramps are all part of the fun! There's something for everyone, all for free — details can be found at rubegoldberg.org.

Q. How does your program address specific challenges and create opportunities for students—from all geographic, socio-economic, and learning levels?

A. Our education programs spark creativity through scientific thinking, improvisation, teamwork, and storytelling. In a LIVE-build Rube Goldberg Machine Contest®, all you need is a pile of junk and a great imagination to build an award-winning machine. Because our contests are free and Rube Goldberg Machines (RGMs) are made from everyday objects — items found in a basement, attic, junkyard, etc. — there is no barrier to entry.

During the COVID-19 pandemic, we made a critical pivot. In the past, our contests had registration fees. During lockdown, however, we wanted to make sure that families, teachers, and young people had a fun, educational activity



to do at home with readily available resources. The task, to Drop a Bar of Soap Into Someone's Hands, was appropriate to the time as well. All contestants had to do was film their working RGM, upload it to YouTube, and send us the link through the registration page on our website. If you had access to a smartphone, you were able to enter! We received 450+ entries from 18 different countries and the creativity we saw was extraordinary. A story about this contest was featured on the CBS Sunday Morning show.² We also launched The Rube Goldberg Minecraft Challenge with the North America Scholastic Esports Federation (NASEF) and reached an entirely different demographic of creators, young people who wanted to build their chain reaction machines in the digital landscape of Minecraft. This brought thousands more, from 22 countries, into the world of Rube. And with NASEF's sponsorship, all participants were awarded free .edu Minecraft accounts.

We continue to find new ways to engage young people with the creativity of RGM invention and construction. We just held our first ever Rube-A-Thon®,³ a timed Rube Goldberg Hackathon, in the Rialto school district of San Bernardino, California. Twenty-one Title 1 schools competed in building machines with a Lunchables themed task. When I draped a winning medal on one of our youngest winners, he exclaimed, "I'm never gonna take this off!"

Over the years, I've come to understand that no matter what your nationality, no matter where you live or what language you speak — everyone speaks Rube. I've seen Tibetan monks building RGMs in total silence, students in Korea creating fanciful machines while wearing costumes,

families in Canada taking over their entire house with a machine, and twin sisters in India working together to invent and build. They all share a common parlance — the visual communication of cause and effect as seen through the lens of Rube Goldberg. Every year, our Rube Goldberg Machine Contests, for students between 8 and 18 years old, pose a single final step that every machine in the contest must complete. For example, we've asked builders to Zip a Zipper, Water a Plant, Pour a Bowl of Cereal, Apply a BandAid, and Open a Book. We announce our annual task

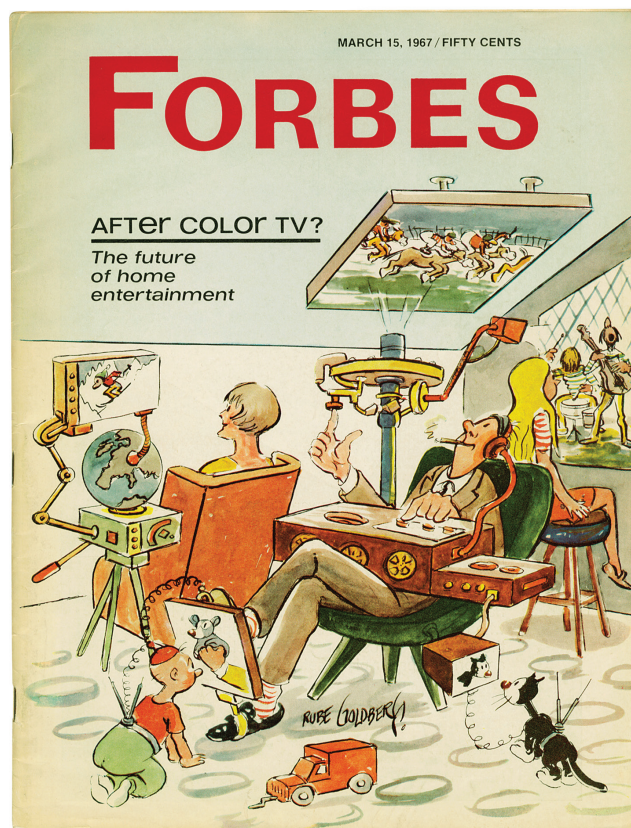
in mid-September and the contest ends in the spring when builds must be submitted. We announce winners in April and send out trophies and prizes when school reopens.

Q. Describe the type of learning that is possible through your program, with a focus on learning that may not be achieved through more traditional approaches.

A. Folks have called Rube Goldberg the grandfather of STEM. Whether you use Rube Goldberg as part of a 4th-grade curriculum to teach about simple machines or to augment your STEM and arts programs, Rube Goldberg

is what project-based learning is all about. Our programs also support social and emotional learning, as teamwork is a cornerstone of the building process. Our live and in-person building activities take kids away from their screens and get them talking to each other, problem-solving together, and engaging with each other. In a classroom or after-school environment, this is magic.

We've also found that kids with learning disabilities thrive with this type of activity. Every year, we hear from teachers and parents who sing the praises of our programs as they describe how these young people, often marginalized in the



social fabric of their peers, are finally accepted when building an RGM. This is music to my ears! I had two siblings with learning disabilities, and so this is personal. It's part of what drives me and why I'm so passionate about the work we do.

Our programs are not only inclusive, they are also interdisciplinary. When I do Zoom presentations in classroom, I address the science kids first, as they will be ideating and building the working chain reaction aspects of the machine. Then I talk to the artists, whose job it is to make the machine beautiful. Next, we move on to the writers; it's their job to theme the machine, give it a narrative, and tell us the story behind the machine — the more absurd and funny, the better. Therein lies the Rube! Then I move on to the actors in the group, and there are always a few; they will be the ones introducing the machine. If there's a costume designer in the mix, they get to dress the presenters. For my final question, I always ask who's the funniest kid in the class. They usually point to someone in the last row, hiding under a desk. I have them come up to the screen and give them their

mission — should they choose to accept it — to make the machine funny. Because, after all, that was Rube's real objective. Yes, he was a trained engineer and, in theory, if you had enough time and the cooperation of anthropomorphic animals, his machines would work. But all he really wanted was to make you laugh.

Q. What challenges or barriers do you experience?

A. The challenge we have always faced — considering we began our programs in 1988, long before the internet existed — is messaging. How do we reach the most people? How do we let educators, teachers, parents, and kids know about our contests? Even though the internet changed everything about how we communicate with each other, we still find that most folks have no idea that we exist. Many schools will do a small Rube Goldberg project for their science fair, but why not join the national competition? It's free, open to all, and you have the whole school year to plan, design, build, and perfect your machines!



The other challenge is funding. As a not-for-profit whose mission is to create a level playing field with zero cost to schools and student teams, we rely solely on support from sponsors, donors, grants, and organizations that support STEM. As a small organization, our time is challenged and fundraising is often put on the back-burner. As the impact of our work is felt more widely, we hope that corporations and foundations will see the benefits of the work we do and help support us in empowering kids through improbable engineering and creative problem solving.

Q. What do some beneficiaries have to say regarding involvement in your program?

Teacher

“I teach 14- to 18-year-old high school students at Rialto High School. I teach physics and MESA (Math, Engineering, Science Achievement). Rube Goldberg machines have been a part of my curriculum for a really long time. They are like a one-stop shop for education. A single machine could be used to teach and demonstrate so many physics concepts, like kinematics, forces, energy, momentum, electricity and circuits, and simple machines. It is also engaging, hands-on, and teaches 21st century skills like communication, collaboration, and problem solving. My students have been participating in regional and national live Rube Goldberg contests for the last 5 or 6 years and have recently started doing the Minecraft Rube contests as well. As an educator, the best part of Rube Goldberg machines is that they are so inclusive, meaning that just about anyone at any age with any skill level can get a pile of junk and make a Rube Goldberg Machine. I had a blind and partially deaf student make a successful machine during distance learning and she was able to demonstrate it for us.”

Museum Director

“We hosted our first Rube Goldberg Contest at the Children’s Museum of Pittsburgh in March 2019 – 6 teams for the apprentice division. The event fit in perfectly with our mission to provide innovative museum experiences that inspire joy, creativity, and curiosity. We saw kids with different skills and interests work together to create something that was completely unique to them and to their community. We had schools participate who had never been to the Museum before. We plan to host two divisions in 2020, and I would encourage any museum to add the Rube Goldberg Machine Contest to its event calendar and experience the magic that happens when you take STEM learning beyond the classroom.”

Teacher

“I teach science at Fairview School, PS 14 in Queens, New York. Preparing for the 2020 Rube Goldberg Contest created an opportunity for our top students and our bilingual students to work together. Communication is central to the design process, so it was amazing to



watch our bilingual students step out of their comfort zones in order to get their ideas across in English. Yet, it was equally as incredible to watch students who began their lives speaking Spanish remember their first language and use it to better communicate with their bilingual counterparts. The discussions that came about in the spirit of teamwork and the design process were every bit as rich as the experience my students had learning to be amateur innovators and presenters.”

Q. How do you measure your success?

A. We measure our success by the kids who benefit from our programs. For example, one student wrote about her experience in the RGMC on her college application. She tells us:

“The Rube Goldberg Machine Contest – it’s been happening since 1988, it’s fun, it’s free, and it changed my life. Let me explain.

Growing up in Batesville, Indiana, I attended a Title 1 school where there were few opportunities beyond the basic classes and activities that our school provided. There was, however, one extracurricular activity that was offered and that my older brothers had competed in, the Rube Goldberg Machine Contest. And in 7th grade, I finally got my chance to join the Jac-Cen-Del team and built my first Rube Goldberg Machine. The task that year was to Zip a Zipper. And while our machine didn’t place in the competition, it lit a spark in me. Building Rube Goldberg Machines became my passion and my team became my family. For five years, I competed in our regional Rube Goldberg Machine Contest and for the last two years my team went on to Nationals and placed in the top three both times. My Rube Goldberg experience was even the inspiration for my college application essay. I now attend Brigham Young University, where I major in communications.

My enthusiasm for Rube led me to an internship with The Rube Goldberg Institute for Innovation & Creativity.”

Our unique programs offer a window into the arts and sciences that can take a young person on the journey from laughter and curiosity to serious study and inquiry. With perseverance, improvisation, and creativity, our RGMC contestants think outside the box and problem solve



through available resources. They also go on to become the next generation of innovators that the world needs for a sustainable future.

Q. What elements contribute to the success of the program?

A. We are lucky to have multiple partners in the education and publishing space. They are:

- **Teq Teaching Tools:** Rube Goldberg PD and curriculum with iBlocks <https://iblocks.com/rube-goldberg-machine-iblocks/>
- **NASEF - Minecraft:** Build RGMs in the digital landscape of Minecraft www.rubegoldberg.org/rube-goldberg-contests/the-rube-goldberg-minecraft-big-build-challenge-sponsored-by-nasef/
- **Unreal Engine - Epic Games:** The Rube Goldberg Kitchen Learning Kit www.cleverlike.com/rube-goldberg-kitchen
- **Dazzling Discoveries:** Origami meets Rube Goldberg www.dazzlingdiscoveries.com
- **Electric Eggplant:** Rube Works - Digital Puzzle Game App <https://apps.apple.com/us/developer/electric-eggplant/id428588934>
- **Abrams Books:** Books for all ages, some with free downloadable curriculum <https://shop.rubegoldberg.org/pages/books>
- **Free Range Games Rube Goldberg Workshop:** Go from virtual reality to mixed reality www.freerangegames.com/rubegoldbergworkshop
- **Legends of Learning:** COMING SOON

Rube Goldberg offers all-inclusive initiatives in STEM and arts education. We are for everyone. Like music, chain reaction thinking permeates all aspects of our lives. Whether you are planning your day and determining

how you'll organize getting from one place to another; coding, knowing that one piece of written code impacts the next, then the next; or writing a joke with the set-up, the story, and the punchline — one thing always leads to another. There is a universal component to the work we do, the language we speak, and the impact it has on young developing minds.

The lesson I've learned is to always keep an open mind, and always keep learning. And I've also learned to look to the future while honoring the past. Nothing replaces an analog build. However, what I have seen in the digital domain in terms of unlocking the potential in kids of all ages is nothing short of astonishing. The UnReal Engine learning kit, which we just launched in 2023, uses amazing technology — software and a suite of tools to teach kids animation skills. This is the latest arrow in our education quiver and something that will, through fun, coding, and visual game-play, train young people for careers in the 21st century.

Q. What resources are available for students and educators?

A. Visit our website and check out our books, some of which have free curriculum attached (also available online⁴) and bring Rube into your classroom. There is nothing like experiencing it firsthand to understand its benefits. We provide all the materials necessary to introduce, host, promote, and run your Rube Goldberg Machine Contest® — templates for judging, scheduling, and budgeting, as well as a host checklist and loads of tips on how to run a successful event. Participants have access to our designed badges and images to promote the contest and our website is full of material, a cartoon gallery, links to RGTV (our YouTube channel), and other resources that help inspire students with their builds.

We are also available via our website to answer any questions. Other resources can be found on YouTube, TikTok, Instagram, and other social media platforms, where #rubegoldberg and #rubegoldbergmachine are searchable and offer millions of results. And we've just launched RUBE GOLDBERG WORKSHOP, a VR game in Meta-Quest 2 that lets you build RGMs in thin air — my grandfather would be gobsmacked!

Q. Do you have any closing comments?

A. In the 20th century, Rube Goldberg was included in The Merriam Webster Dictionary as an adjective:

*“Rube Goldberg: adjective
Rube Gold-berg 'rüb-'gōl(d)-.bərg
variants or less commonly Rube Goldbergian
'rüb-'gōl(d)-.bərg-ē-ən -bərg-yən
: accomplishing by complex means what seemingly could be
done simply
a kind of Rube Goldberg contraption ... with five hundred
moving parts
—L. T. Grant
also : characterized by such complex means”*

Now, in the 21st century, thanks to the efforts of students, creators, professionals, ad agencies, and filmmakers, Rube Goldberg is a verb. Over half a billion posts for #rubegoldberg proves the point. Today, the question is “Do you Rube?”

Notes:

¹ www.rubegoldberg.org/all-about-rube/a-cultural-icon/

² www.cbs.com/shows/video/IyNwqHsrGJEGNr8HC5qKrNvOyJB_6mu/

³ https://drive.google.com/file/d/1wJcgdoylmC8WuY_r81DK8mDSI-UixoOd/view?usp=drivesdk

⁴ <https://www.rubegoldberg.org/rube-resources/resource/education/>

Video testimonials:

- **Interview with a science chair:**
<https://otis.teq.com/events/view/16459>
- **Teacher testimonial:**
https://drive.google.com/file/d/1fhXiueIa1rnNY9IO3Vpy_mmeVLpRBOAgj/view?usp=drivesdk
- **Student testimonial:**
https://drive.google.com/file/d/1Xc3MT-jEqX3E2eC3nYXVljj_3-CBi1ev/view?usp=drivesdk

About the Author:

Jennifer George is literally the DNA of the Rube Goldberg Institute, overseeing all aspects of her grandfather's estate. She has led this effort since 2007, conceiving and developing a new generation of cultural events and educational initiatives that link art, science, technology, and entertainment in visionary ways. Under her watch, the Institute manages annual competitions, traveling exhibitions, consumer products, and entertainment properties that enhance the brand and support its mission promoting equity and access in STEM and art education.

