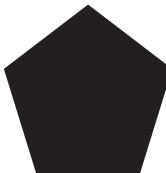




Catalogue 1

RISD + Brown STEAM

Fall 2013



*RISD + Brown STEAM are funded by*

RISD Center for Student Involvement (CSI)  
Brown Creative Arts Council  
Brown Creative Mind Initiative  
Brown Science Center

*special thanks to*

Sarah Pease, RISD '13

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John Maeda, President of RISD

Rachel Mollicone, Communications Manager, RISD CSI

*without whose help this project wouldn't be possible*

**We are RISD + Brown STEAM.**

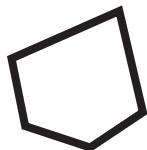
**We strive to integrate the creativity and aesthetics of the arts; the problem solving tools and rigor of the STEM fields; and the critical thinking and ethical considerations of the humanities. We believe that this unification powerfully drives progress toward the future.**

**This is our first Catalogue.**



This Catalogue, like the catalogue of a show, is a collection of work. At STEAM, this includes workshops, lectures, discussions, film screenings, and writing we did this fall.

The theme of this Catalogue is  
“What is STEAM?”



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## Where we're coming from: RISD STEAM

Ryan Flomerfelt Mather

Recap

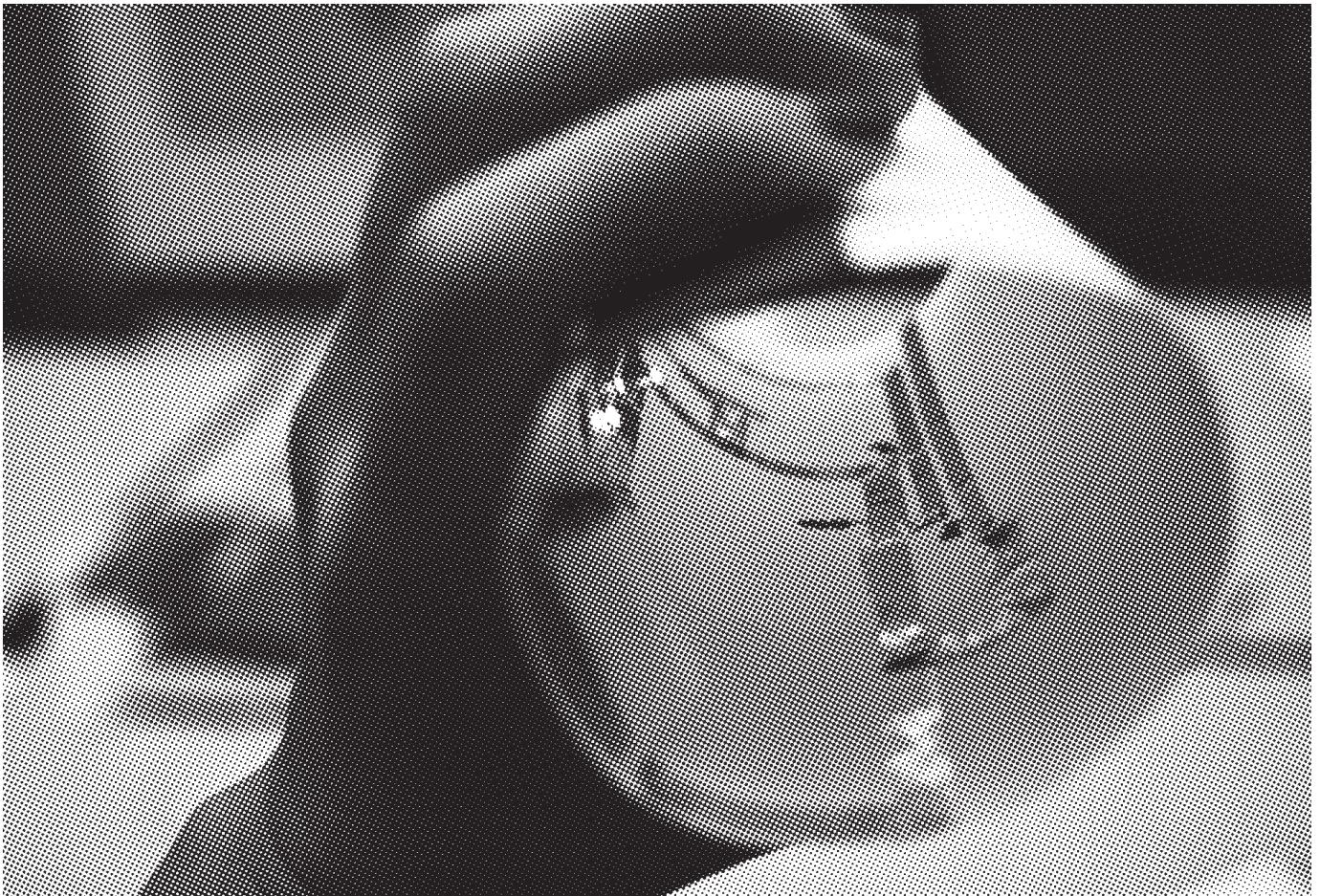
Although a lot is happening right now in the STEAM ecosystem, it is important to recognize how we got here. You could say it all started with sputnik, or DaVinci's sketchbooks, but STEAM really started to gain momentum on RISD's campus during the height of the recession. During a RISD board meeting, board-member Jon Kamen proposed to insert 'A' in the middle of a increasingly problematic 'STEM' acronym to add creativity as an essential component to education. By 2011, this sentiment had trickled down to the undergraduate level and RISD STEAM was started by Sarah Pease. She was a Junior at the time working in the Office of Government Relations at RISD. Sarah saw the need for a student-lead arm of the institutional initiative. One logo, and a trip to the Center for Student Involvement, and RISD STEAM was born.

The first truly meaningful event that RISD STEAM put on was a Wintersession workshop series conducted by Graduate researcher at the MIT Media Lab Jie Qi called "Paper-Based Electronics". Workshop participants at both RISD and MIT explored electronics though an unusual means: paper. Jie was

investigating how artists and designers work in comparison to scientists and engineers (and vice versa). At our final critique, students spoke about their process, and what brought them to their final piece.

We realized that one of the values that art and design can bring to a multidisciplinary process was the ability to extort "happy accidents". A number of the projects resulted from something accidental being turned up to a higher level. The STEM majors approaches seemed to have a more linear path, which had advantages of its own in that a number of their projects were realized to a finer level of completion. The work was later shown in the Say Something poster competition in Boston, MA, where Jie appeared as a "Guest Exhibitor".

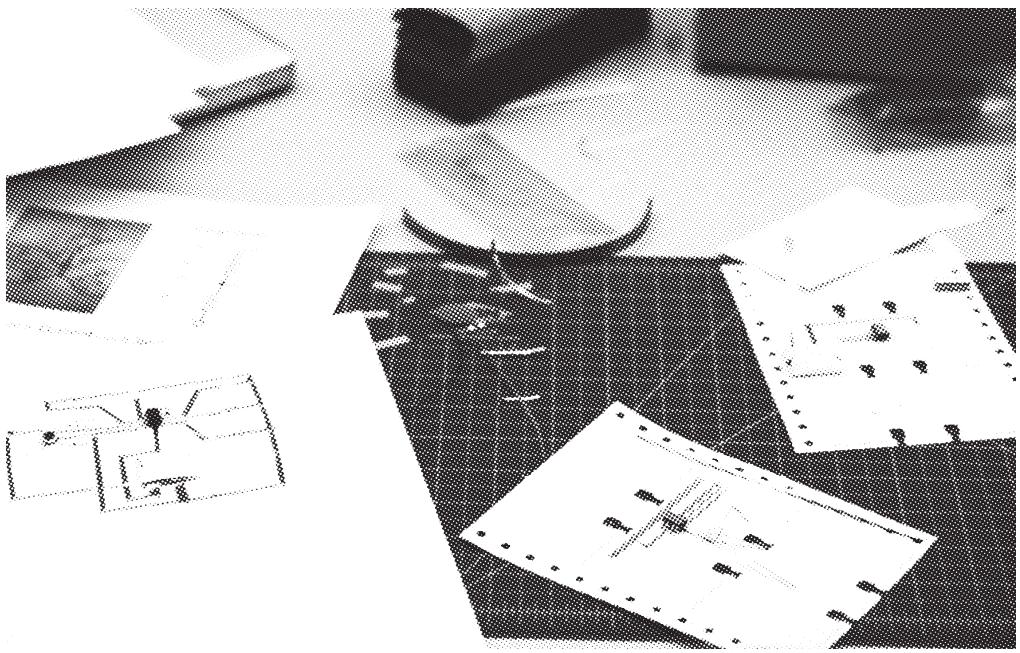
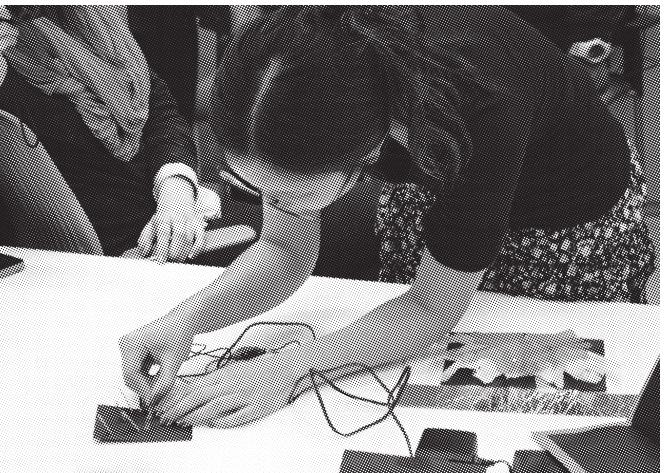
Another highlight of RISD STEAM programming was when we invited Gary Grice or "The GZA" from the Wu Tang Clan to speak to the student body about the value of k-12 arts education. "I've always been fascinated by astronomy and physics," he said. The GZA referenced some inspiring stories about arts



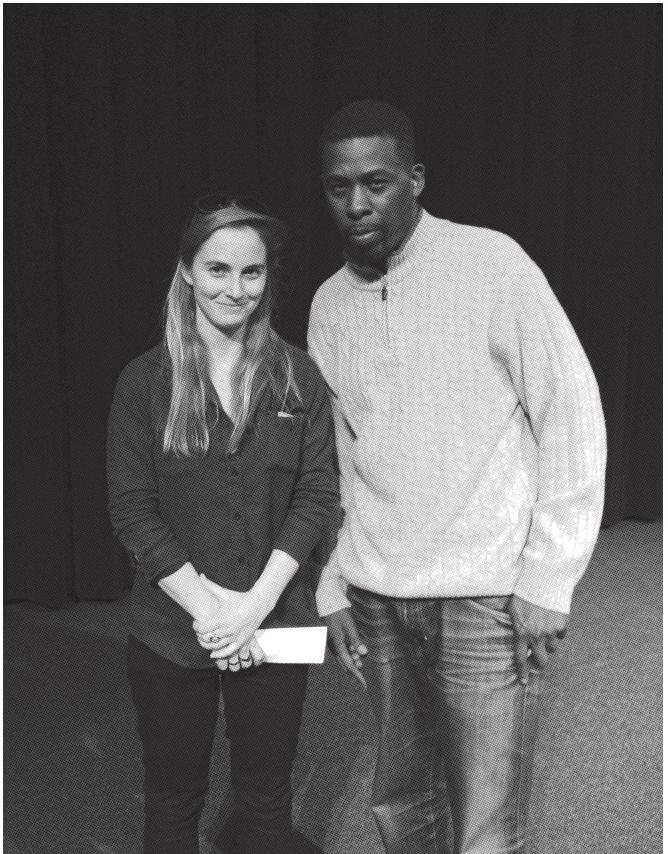
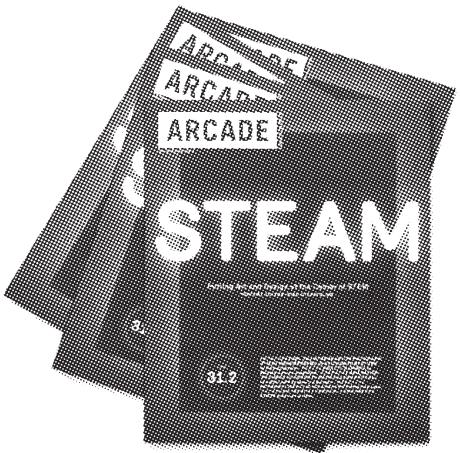
*A workshop participant holds work from our "Paper-Based Electronics" workshop in winter 2012.*

integration, and even performed some of the lyrics he had been working on.

In the spring of 2013 Brown STEAM started to gather momentum and the combination of these two groups of leaders has been instrumental in gathering traction.



*Clockwise from top right: "Paper-Based Electronics" workshop facilitator Jie Qi demos a student project; beautiful circuitry; Jie teaches us how to solder.*



*Clockwise from top right: RISD STEAM founder Sarah Pease with the GZA after his talk in November 2012; students and k-12 teachers gather for a STEAM education brainstorming sesh Spring 2013; RISD STEAM guest-edits Arcade Magazine's Spring 2013 issue.*

## Where we're coming from: Brown STEAM

Hanna McPhee +

Recap

Michelle Site

During the 2011-2012 academic year, Rhode Island Hospital—the teaching hospital of Brown University's Alpert Medical School—collaborated with the Rhode Island School of Design to create Carrefour, an exhibition examining the intersections of biomedical research and art. While serving as the exhibit coordinator, Michelle Site learned of the STEAM movement at RISD from Babette Allina, the Director of Governmental Relations at RISD and Carrefour curator.

Inspired by the immense power of interdisciplinary projects and imagining a vibrant community of hybrid students on College Hill, student co-founders Michelle Site and Hanna McPhee teamed up to bring STEAM to Brown.

Brown STEAM seeks to encourage students to embrace Brown's unique identity as a liberal arts university and a research institution. We advocate for students to explore interdisciplinary learning, bridge the sciences and arts, and create new ways to approach their projects. Our community incubates students' out-of-the-box ideas, and provides an intellectual and academic home for interdisciplinary students while nurturing their explorative journeys.

Our first semester centered upon exposing students to the different disciplines and empowering their ability to enrich liberal arts education beyond completing a specialized major. We hosted our first event in February 2013, when the hybrid art installation How to Build a Forest came to the Granoff Center for the Creative Arts at Brown. This 8-hour immersive art performance started with an empty stage and ended with a built forest alive with sounds, textures, and sculpted organisms. During the live installation, Brown STEAM hosted a panel of artists, scientists, designers, and students to discuss STEAM in the context of How to Build a Forest and why its interdisciplinary nature made the installation so effective. Brown STEAM focused the rest of spring semester amassing a student following and faculty support while partnering with the Creative Arts Council and the Science Center.

In the fall of 2013, Brown STEAM happily formalized its relationship with RISD STEAM. With this new partnership, the collective STEAM mission strives to integrate the creativity and aesthetics

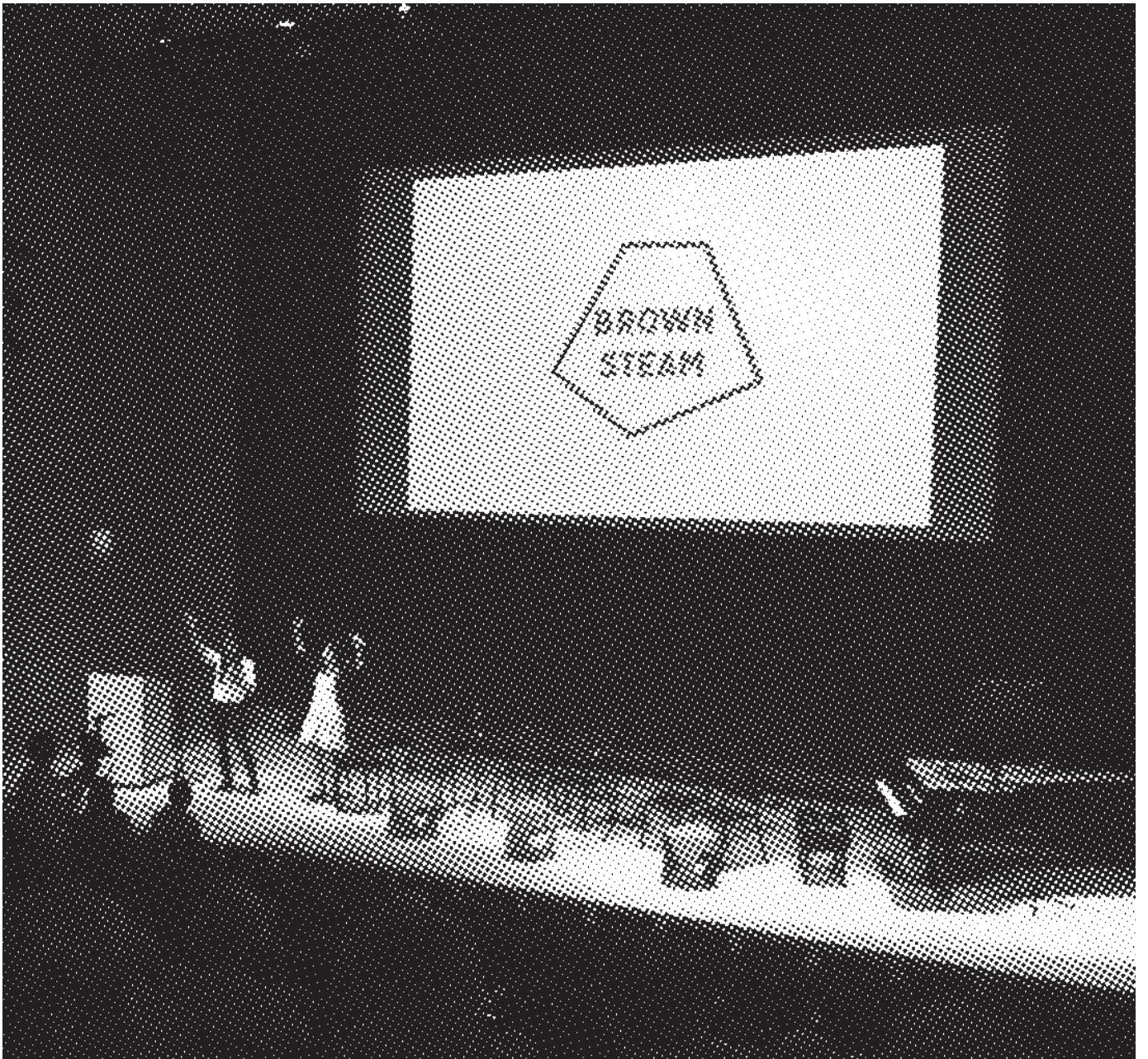
**Brown STEAM seeks to encourage students to embrace Brown's unique identity as a liberal arts university and a research institution. We advocate for students to explore interdisciplinary learning, bridge the sciences and arts, and create new ways to approach their projects.**

of the arts; the problem solving tools and rigor of the STEM fields; and the critical thinking and ethical considerations of the humanities. We believe that this unification powerfully drives progress toward the future.

We look forward to STEAMing with you!

**In August and October, Brown STEAM co-presidents Michelle Site and Hanna McPhee presented STEAM to both Brown University's Advancement Office and during Alumni & Family Weekend. In hopes of spreading our unique approach to analytical and creative thinking, we advocated for the incredible potential of the STEAM movement.**

*Hanna McPhee and Michelle Site assuming their "superwoman" position before delivering their speech on STEAM to alumni during Brown's Alumni & Family Weekend*



## Design Theory



## Scientific Process



I am sitting across the table from my thesis advisor. We stare at one another in silence, our faces reflecting equal levels of frustration. After a 15-minute debate on the differences between a parameter and a constraint, it has become apparent my advisor is an engineer, and I am not. My advisor and I meet weekly to discuss my research. Each week we inevitably hit a wall; expressing the same words, but interpreting them in entirely different ways. With a background in biology and design, my definition of details often do not align with an engineer's. However, we both know the objectives of my thesis, and both want to work towards that goal (and diploma).

So why are we having such a difficult time communicating?

It starts with the realization that our different disciplines do not speak the same language. Up until the past few years, my education centered around finding a path and, for the most part, sticking to it. If you are good at math, you stay on the honors track through middle and high school to become a "math

person". Even later, with a liberal arts education, I felt swayed to identify myself solely as a "biology person". There was never room for another subject like art, no space for speaking two languages fluently. My educational system created silos between the different disciplines. Once I chose one path, essentially my language, other subjects became foreign.

Connections are missing between these disciplines, and in particular between the arts and sciences. On almost every project I have worked on thus far, my analytical and creative teammates have struggled to connect. From deadlines to critical thinking, collaborating has been as difficult as a native English speaker interpreting Italian. Sure, perhaps some root words are similar. But you end up just speaking loudly at one another, waving your hands around as a flailing final attempt at communication.

Fortunately for me, I was given the opportunity to create my own concentration and fully integrate biology and design into one cohesive means of critical thinking. But it would

be extremely naïve to think that type of interdisciplinary education can be implemented everywhere – and nor should it be. We still need the classically trained “quant jocks” as well as the “edgy creatives”. Without them, a melting pot of full-fledged hybrids such as myself would lose any sort of concrete base for reference.

So where do we go from here?

I believe each individual, no matter how much of a purist they may be in their respective field, should be responsible for entertaining interdisciplinary ideas. Exposing ourselves to different disciplines results in a better understanding of our peer’s work. With this deeper understanding, we create a greater means of respect. Whether that takes the form of double majoring, or simply taking a few electives, some threshold of interdisciplinary thought is important.

In an era where buzzwords like “collaboration” and “innovation” land you a job, its time to actually start flexing both sides of our brains. At the

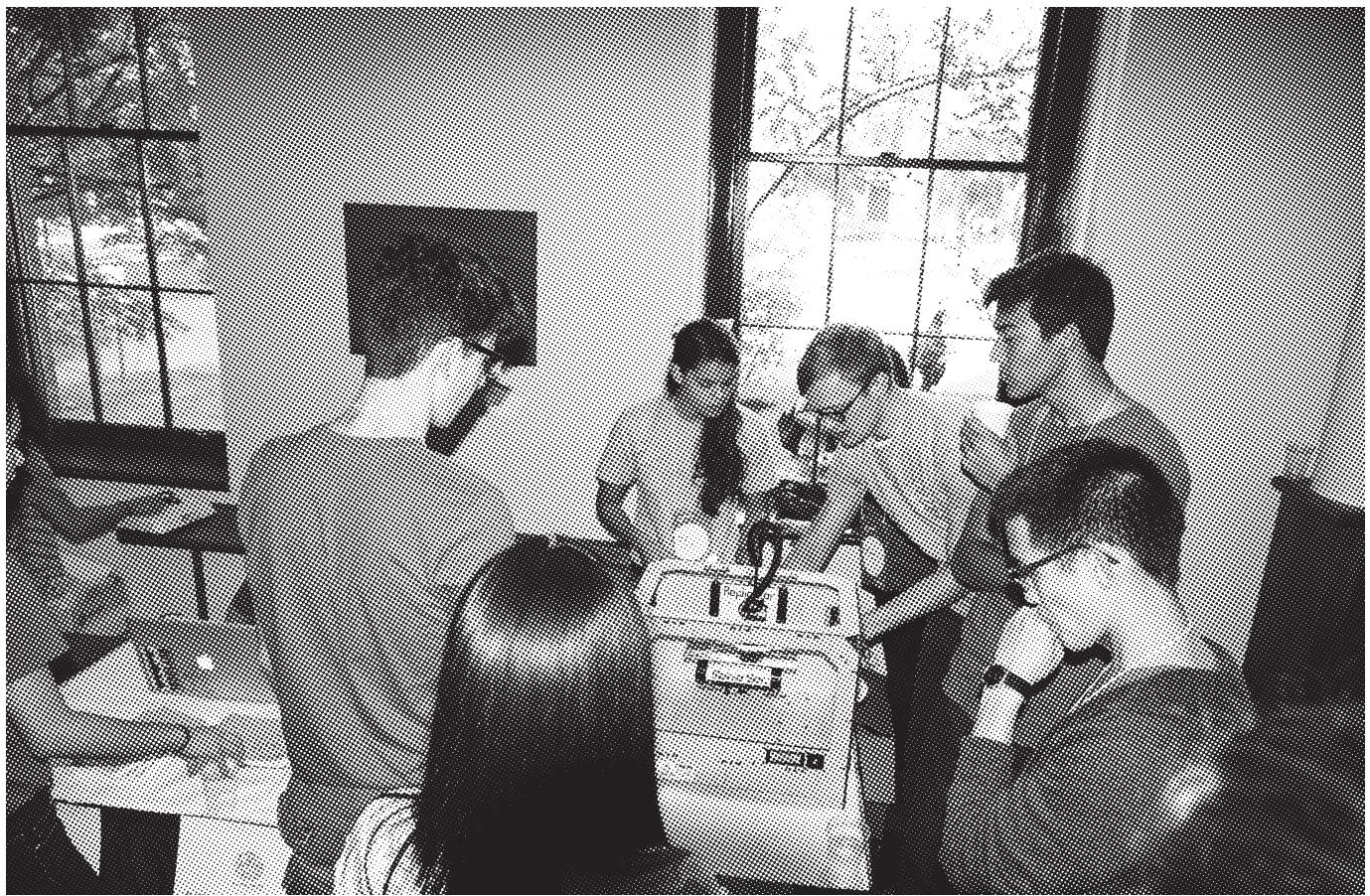
end of this journey, behind our various languages, it is surprising how similar my analytical and creative peers are. My STEM friends always shudder at the free flowing process of iterating and prototyping. My designers laugh at the time spent nit picking over numerical data, seemingly so far removed from the problem at hand. However, at the end of the day, both are following almost identical steps towards finding solutions. The proof can be found just looking at the scientific process alongside design theory.

Although one approach may rely more on quantifiable data and the other on a more “human” means of communication, step by step the two share striking similarities. Combining these two theories helps me personally make sense of my own analytical and creative brain. When they come together as one scientific and artistic critical thinking tool, the result is a deeper understanding of defining problems and finding solutions. In short, the banter between myself and my advisor is not about the difference between parameters and constraints. It is about the exposure to a new language.

**Although one approach may rely more on quantifiable data and the other on a more “human” means of communication, step by step the two share striking similarities. Combining these two theories helps me personally make sense of my own analytical and creative brain.**

My thesis will teach me many things. But I sincerely believe my weekly exposure to my advisor’s brain – and all the neurotic details that come with it – will influence me the most when I walk out into the working world.

*This essay was originally published on mills-scofield.com*



*Hanna McPhee and Lukas WinklerPrins operate a  
MakerBot at the BWxD registration desk.*

This year RISD + Brown STEAM collaborated with the Fifth Annual A Better World By Design Conference(BWxD), a student organized, design impact conference, enticing crowds of tech enthusiasts, industry moguls, design nerds, and the like to Rhode Islands' creative capital.

As big fans of BWxD, it was an honor to sponsor three cross-disciplinary STEAM events at this years conference. Our goal was to bring workshops to highlight how art and design are integral to innovation and the advancement of technology and to highlight the Makers that are making strides in the STEAM fields . We figured electronic textiles, NASA grade Moonbuggies and buckets of the world's favorite colorful building blocks, might do the trick.

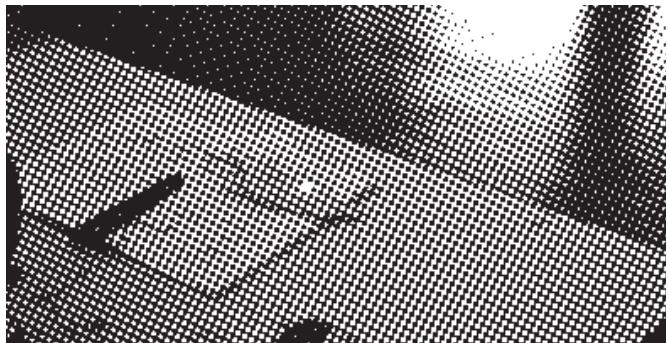
Across campus, our RISD + Brown STEAM teams activated Makerbots, 3D printing BWxD memorabilia and our own swag to show how rapid prototyping machines can quickly generate tools for the everyday!

We had a great time at BWxD and look forward to sharing more on the STEAMclub! A big shout to the 2013 Better World By Design Team, you guys ran a tight ship and put on a killer conference! Thanks for having us!



*The Moonbuggy prototype whizzes by on the Brown main green.*

Driving circles around the crowds of designers and techies, The RISD Moonbuggy team, led by Kendall Gremillion and Nick Bacovic took to Brown's Main Green offering rides on last years prototype for NASA's The Great Moonbuggy Race. This NASA Competition challenges teams to create the fastest collapsable vehicles to maneuver through a simulation course of lunar terrain. To combat a landscape of craters, lava ridges, and inclines with a de-constructible car is a great challenge of engineering and physics, and this Art school has been ranking in the top tier against many of the nations best engineering schools, taking third place in 2009, and the "Best Design" award in 2011. Their determination and positive accolades are a great example of art + design's value in STEM fields.



*Clockwise from right: a betterworlder holds workshop supplies; a final product; 30+ betterworlders pack the room; Chase helps a workshop participant.*

**Augustina Bello and Chase Taylor, two recent graduates of the RISD graduate program who had been experimenting with thermoplastic materials, melting processes, LED's and Arduino during their Masters studies at RISD, instructed participants in basic circuitry and their integration into felt patterns. Betterworlders left with their very own Arduino-creations in hand, an understanding of foundational circuitry and how electronic textiles can be used today, both in fashion and technology.**

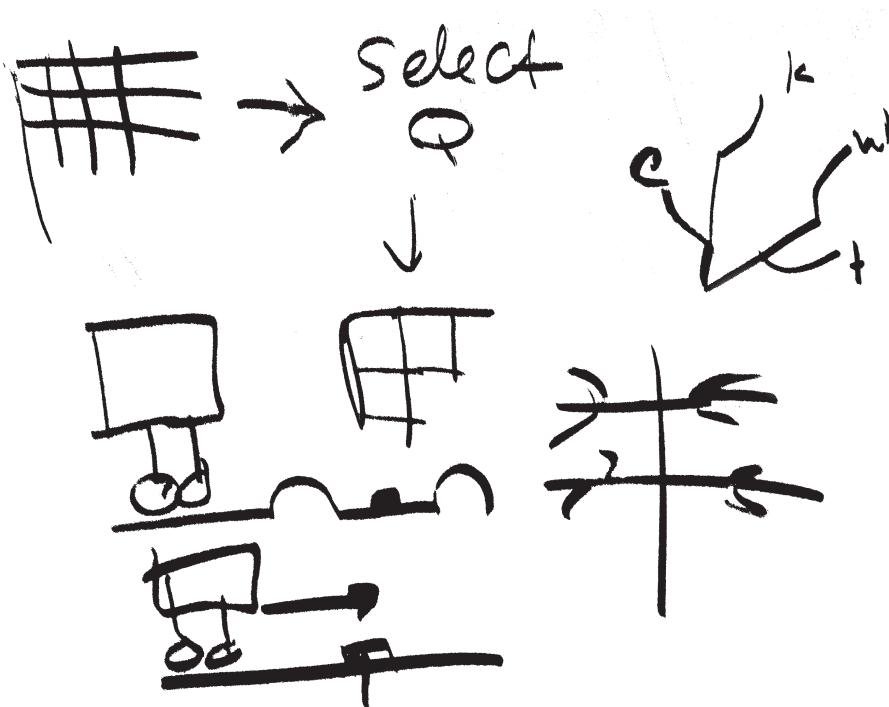
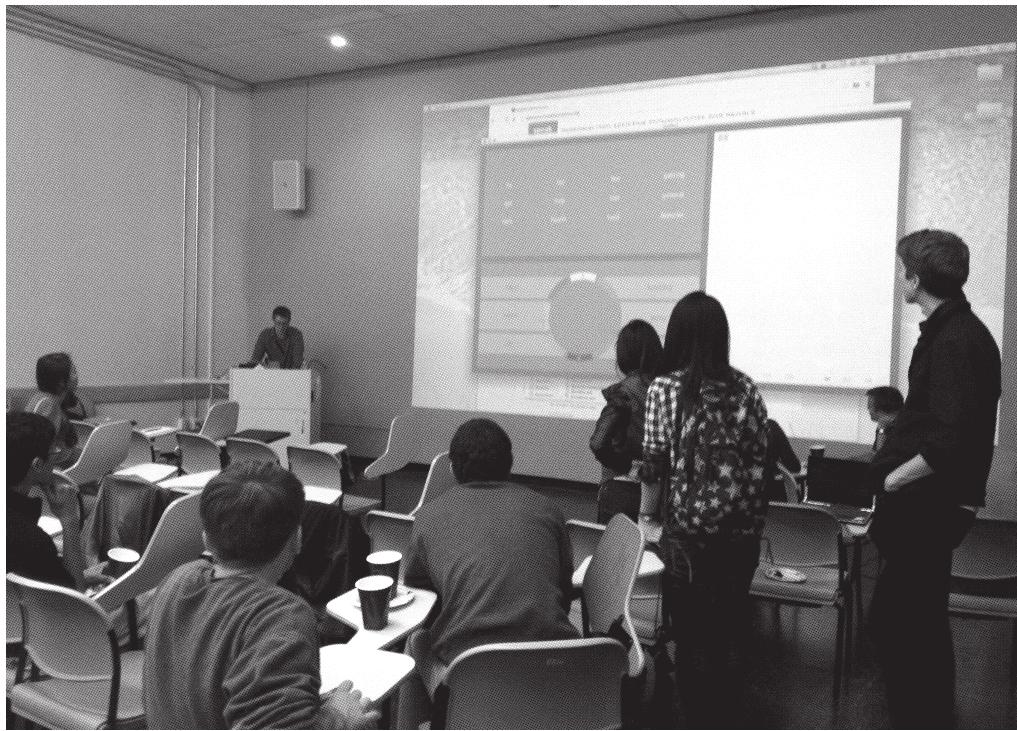
**Augustina Bello is currently a Materials Innovation Designer with Converse and Chase Taylor is working for Pollack, a textiles studio. Keep your eyes out for these ladies!**



*Clockwise from top right: a table-ful of LEGO; participants share their creations; a participant follows instructions; Lukas checks in on the building process.*

**LEGO—what does it make you think of? A children's toy? What if you could see it as so much more? In this workshop, Lukas WinklerPrins from Brown showed participants how to re-imagine the colorful plastic bits as an art medium and communication tool. Builders were walked through an iterative design process and pushed to express themselves in a playful mix of staying within and pushing the boundaries of the building blocks. In addition, workshop attendees were given a glimpse of the world of adult LEGO fans—a world full of amazing and complex creations enmeshed in a thriving, supportive community.**

**Brown+RISD STEAM would like to thank Ian Gonsher for use of his LEGO collections.**



*From top: CEO Dan Bacher speaks to workshop participants; blackboard sketches from the workshop.*

In October, Brown STEAM hosted the Speak Your Mind Foundation for a user interface workshop focused on designing low cost communication aids for those with communication limitations. Speak Your Mind Foundation is a non profit collaborative team dedicated to empowering individuals with motor and speech limitations to connect with the world. A collaborative group of engineers, clinicians, designers, hackers, and social entrepreneurs; SYM is passionate about giving their clients control of their environment and the power to speak their minds. They do so through low cost assistive technologies like eye gaze tracking systems for any home computer.

Participants in the STEAM workshop collaborated on actual client case studies in order to research and assess user needs, as well as ideate and prototype communication devices. All backgrounds were encouraged to join. We strongly emphasized no user interface technology experience as UI often intimidates those without an engineering or computer science background. Art, design, engineering, biology and humanity

concentrators all attended the workshop to work as a collective team.

The first half hour, CEO of Speak Your Mind, Dan Bacher, presented the non-profit's mission and previous products. He then introduced four clients, Cathy, Maggie, Steve, and Gerry. Each client presented different communication disabilities and needs. As groups formed, engineers and tech experienced students dispersed amongst design and humanities concentrators. Each team took on a different client, aiming to understand their disability and needs. Team Gerry, comprised of an industrial designer, anthropologist, biologist, and mechanical engineer focused on Gerry's love of crossword puzzles. Gerry has ALS and came to Speak Your Mind looking for an adapted mouse sensitive to her limited hand mobility. She also was adamant about not losing her ability to solve crossword puzzles online. The Brown/RISD team spent the next hour brainstorming via chalkboard different software and hardware solutions mimicked off of car stick shifts and childhood toys in order to realize Gerry's needs.

creative mind

• Brown  
University

Creative Scholars is a weekly conversation, organized by Ian Gonsher (Lecturer in Engineering) under the Brown Creative Mind Initiative, to connect people across Providence on projects celebrating creativity, education, and interdisciplinary projects. It regularly brings together a mix of RISD and Brown educators, administrators, undergraduate, and graduate students. STEAM became a recurring theme in Fall 2013.

Hanna and Lukas of Brown STEAM and Catherine of RISD STEAM have been regular attendees since October 2013.

Conversations have broadly focused on implementation of STEAM ideology in classroom settings, and reconsidering what a classroom setting means. Through conversation, we have differentiated design thinking versus STEAM thinking, a class studying STEAM problem-solving versus a class utilizing STEAM problem-solving, and what it takes to implement truly integrative education in a variety of settings (K-12, a single workshop, a college class, etc.).

As of this writing, the ideas discussed in Creative Scholars will be implemented

in a 4-week Summer 2014 Digital Fabrication course at Brown mixing in-person and online learning, organized by Ian Gonsher and Jesse Schreier. Creative Scholars continues to serve as a resource and inspiration source for STEAM in application and outreach.



*Clockwise from right:  
artist Dianne Rielly  
speaks at Brown;  
students visit  
Rielly's studio in MA;  
Brown's Hay library  
collection of scientific  
illustration on  
display.*

## Beauty, History, and Scientific Illustration

Beauty, History, and Scientific Illustration was a two-part exploration on October 17, 2013. Participants dove into rare artfolios from Brown's Hay Library specialty collection and then engaged in a creative workshop led by scientific illustrator and muralist Amy Bartlett Wright.

Amy introduced how to use visuospatial techniques for problem solving and understanding complex scientific concepts. Attendees engaged in a drawing exercise with a knobbed whelk and lots of experimentation.

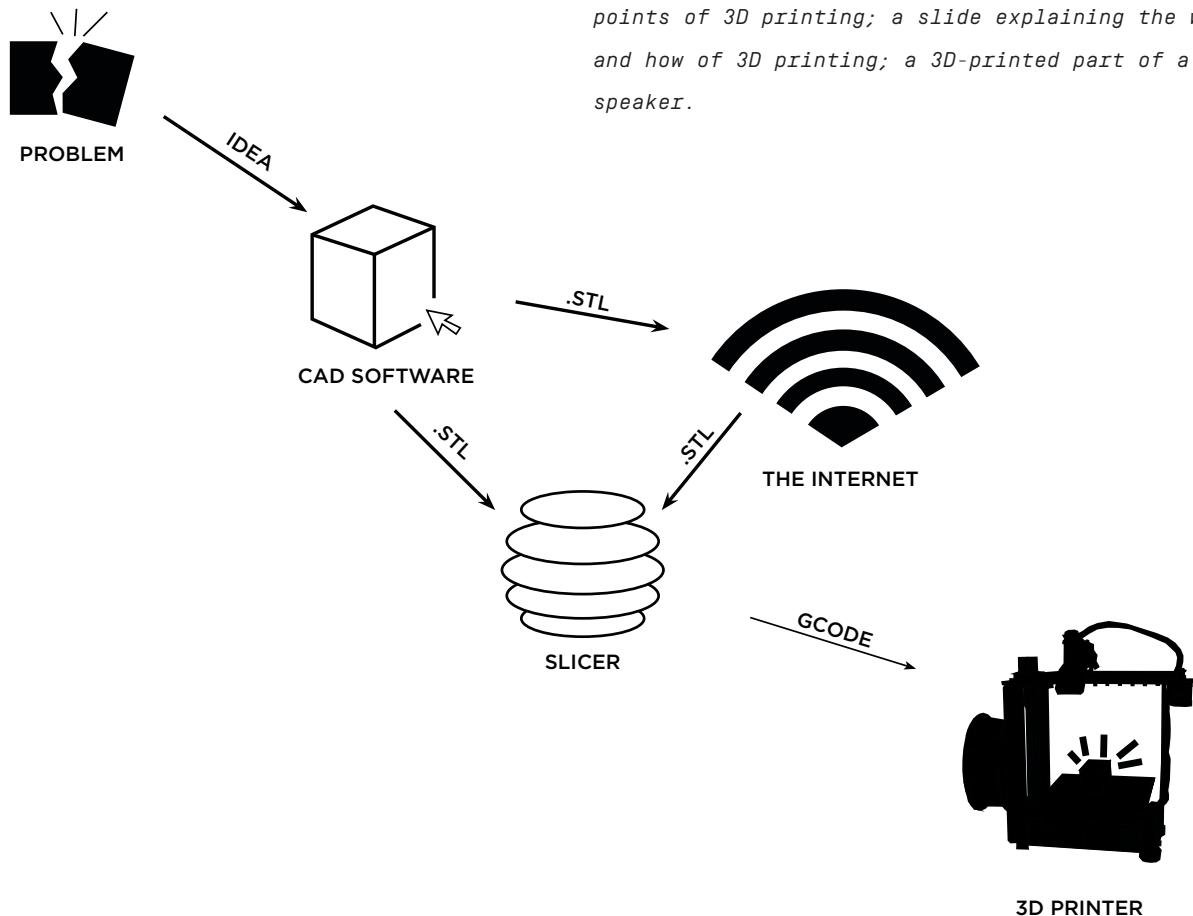
## Artological Bioformations

For our Making Visual Biology series, Brown STEAM engaged with artist/metal smith Dianne Reilly in both an artist talk and a studio visit.

On Monday, November 11, Brown STEAM hosted Reilly in a talk during which she reflected eloquently upon her life, inspiration, and craft.

On November 17, a group of nine traveled to her New Bedford, MA studio to visit her studio- a converted church space filled with tools, inspirational biological objects, and beautiful pieces of art.

Reilly's work uses biological materials and biologically-inspired forms; the pieces take on a wide range of forms and all question the act of looking. Some examples of her work include pig intestines transformed into intricate viewing pieces with detailed colorful interiors, a jewelry series exploring melanoma, and meditative vessels with butterfly wings, flasks, and enamel.



This workshop served as a primer on 3D printing technology. We focused on FFM, the most popular method for desktop printers, although SLA printers are gaining more and more popularity over time. Ryan Flomerfelt Mather lead the discussion talking about how bits make it from the internet into a physical manifestation. Mather pointed out that sometimes 3D printing something is not the solution to innovation or rethinking a company's methodologies.

There are a number of benefits to 3D printing however, and as people re-imagine the role of printers and how they can be used, 3D printers will have a role in more and more settings. To push this idea the participants in this workshop got together and designed speakers to be printed and turned into functional pieces. This idea was given to STEAM from our informal mentor Ian Gonsher from the Creative Mind initiative at Brown University. Mather found that by wrapping some household speaker wire around a rare earth magnet that was glued to a thin drum, he was able to make a functioning speaker that could plug into a radio receiver.

Students were able to follow up with facilitators during "office hours" to pick up their printed speaker and test out its sound qualities.

Today, Nov 6

7pm, RISD Auditorium

7pm, RISD Auditorium



Today, Nov 6

## "If You Build It"

Catherine Leigh Schmidt

Film

"If You Build It" is a film about the efficacy of inserting design-build projects into school curriculum. The documentary follows designers Emily Pilloton and Matthew Miller as they bring back shop class, with a twist, to a rural North Carolina high school. Pilloton and Miller face no shortage of issues implementing their curriculum – namely, they forgo being paid in order to continue – but in the end are able to carry out a year-long design-build project in which students learn the design process, design a structure for the community, and build it themselves.

Design-build projects are becoming increasingly popular, and a design-build project has been a part of the RISD Architecture curriculum for the past several years. However, Pilloton and Miller's approach combines a design-build with a high school design curriculum. As we at STEAM continue to explore the role of STEAM in education, we have our eyes and ears open to approaches to teaching design ideas at the k-12 level.

After contacting the film's distributors in the summer, we had the opportunity to screen the film at RISD on November 6, months before the film's release date in January 2014.

The house was far from packed except for a few STEAMers – I think we had promotion problems – but those who came walked away with a greater understanding of how STEAM could be implemented in schools. The documentary takes an honest look at Pilloton and Miller's curriculum, showing both the triumphs and the failures. At the heart of the film is the idea that the high school students of Bertie County, NC, are better equipped to contribute to their communities, and more likely to stay there, as a result of basic training design and building. This is a film we would definitely recommend. Many thanks to Christine O'Malley and company for letting us show the film!

One night this fall, I found myself at a late-night eatery with my college student friends talking about what we were working on that week. I was hung up on a particular problem in a fluid mechanics problem set involving non-viscous flows. Mouth full of sandwich, my friend Dan asked what was keeping me from solving it. Did I have all the necessary mathematical tools? Had I seen the useful techniques? Was I misreading the question, or misunderstanding what it was asking for? I didn't think so. I answered simply "I haven't spent enough time staring at it."

For a while, this response bothered me. What I meant is that I understood the problem, but that I needed to work my way ploddingly through the correct technical work. But mathematics is a field in which abstraction is prized: an elegant problem is one that strikes interest regardless of context or application, regardless of the technicalities; being bogged down in them is thus embarrassing. In much of math, fully understanding and defining your problem means you are 90% of the way to solving it, and there I was swimming in the last 10%. Why was I being forced

to struggle with the uninteresting part of a problem that had been solved by a long-dead German engineer?

With time, however, the necessity for this work has grown on me. My friends down the road at RISD spend hours in physical labor: throwing pottery, working the loom, blowing the glass, mixing the paint. Not every second of it is an illuminating moment of artistic creation. This arts education starts with the mechanics and builds upwards—freshman “foundations” year at RISD contains a lot of gruntwork. It is, in many ways, putting students through the motions, but does so in a productive way; after this period, students have a diverse skillset and a sense of dexterity in their media of choice. Comfort with the technical aspects, through (occasionally mind-numbing) repetition, provides a platform on which more meaningful, theoretical work can happen. (This is very much a Zen in the Art of Archery idea, a short 1948 book by Eugen Herrigel.)

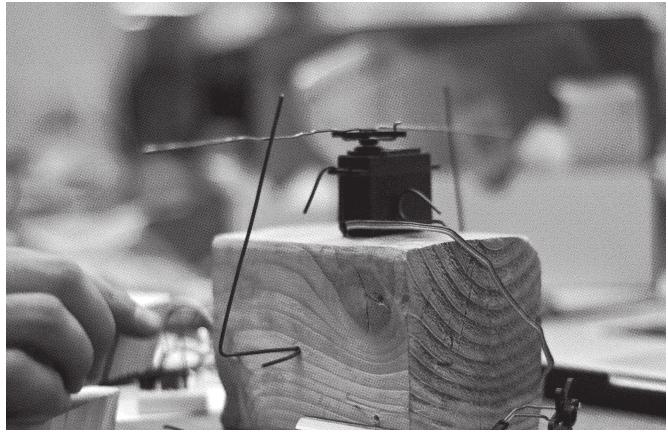
This progression is similar in mathematics. As a young man, I have spent countless hours working on rote,

# Why was I being forced to struggle with the uninteresting part of a problem that had been solved by a long-dead German engineer?

repetitive problem sets. I have stared at little scribbles on paper, my medium of choice, for so long that I am just starting to tickle a dexterity with which I can express myself and tackle truly important questions. I spent two years of high school in calculus classes; now I can see articulations of Newton's invention all around me—I can speak the language and add it to my toolbox. Just as we spend hours learning to write the alphabet so that one day we can write a poem, I have spent so much time thinking in math that the mechanics are autonomous, and the results going forward all the more beautiful and important.

So I'll stare a little more at my problem sets. Tiresome as the work may be, I know my mastery of medium will come.

*This essay started as a post on Lukas's blog.*



*Clockwise from top: Workshop participants from above; TA Celine Chappert takes a break; a participant's "Pointless Machine".*

RISD and Brown STEAM teamed up for this awesome workshop in mid-semester Fall 2013. Ryan Flomerfelt Mather and Lukas WinklerPrins teamed up with two RISD STEAM members, Celine Chappert and Gavin Atkinson, to facilitate some Arduino education in the STEAMiest way we could think of, by making art objects out of them! There was also much help from Ian Gonsher, a professor at Brown University, in designing the workshop experience. The facilitators started off with an introduction of relevant work from artists such as Arthur Ganson and RISD's own Kelly Dobson.

From there we began explain all of the various bits, and what the IDE does. This was a lot to take in all at once so we took a short break before we dove into creating some simple circuits, such as the classic blinking LED. Then, facilitators opened up the goals to whatever pointless machine the participants wanted to animate. There were several different types of wire from which the participants could grab and experiment with.

We found that an emphasis on remixing code was important to get the ball

rolling, once the participants realized what they wanted to make for their final piece, they then dove in and started to really understand what every line meant. This lead to each participant getting a customized learning outcome, and because of this all four facilitators were helping out for the duration of the event! This was a very successful aspect of the workshop.

At the very end the facilitators prompted the participants to give a show-and-tell. We were really impressed by what the participants were able to come with through inquiring upon the prompt of "pointless machines". Ben Snell, a freshman at Brown, created a machine that had two arms that were cyclically reset. Ben urged us all to listen to the sound of the metal springing back after being struck by the motor. The fact that Ben was able to not only be able to start to understand the coded DNA of the circuit he created, but also be able to understand how that code feels and sounds viscerally was really exciting. We need to move past Data Visualization and into Data Visceralization. This workshop was a good step forward in that direction.

As a child, I fell in love with science the first time I peered through a thin glass case at a Blue Morpho butterfly. Unabashedly iridescent and delicate, the butterfly shined in equal parts mystery and beauty. As I continued to explore as a teenager, science explained my visual world and provided a lexicon of marvelous explanations for mechanics I sensed but could not articulate. Curiosity, aesthetic appreciation and intellectual fulfillment became inextricable from my relationship with biology by the time I entered college.

I experienced the sterile reality of collegiate introductory science courses by my second semester at Brown. With inaccessible delivered content and overwhelming class sizes, the science classroom suddenly became removed. I passively accepted the myth that the sciences require “weed out” courses for two intellectually unfulfilling years – until I realized this classroom culture can and must be changed. The existing paradigm transforms the early learning experience into a destructive zero-sum game – students implicitly believe that science education

purposefully aims to rid departments of “weak” students and leave standing only “gifted and elite” ones.

Instead of presenting science in a clear manner that focuses on teaching a sound foundation, the current system portrays science as opaque, focused on minutiae and intentionally difficult to learn. But drear and struggle are not signs of hard-earned understanding. Dreary and struggle are the signs of a failing science pedagogy and a desperate need for a revitalized curriculum. As a result, we often lose incredibly bright and creative minds to non-scientific fields and endure a suffering public opinion of science.

The crisis in technical education stems from its failure to clearly convey beauty, relevance and purpose to either its students or the general public. The sciences and mathematics are gorgeous languages that come with their own lexicons and pragmatics. Introductory classes must be taught in a way that does not alienate students before they obtain fluency. How do we ensure students successfully reach higher level classes so they may transform the mastery of

their technical tools into creative products and discoveries? How do we restructure science education and its public perception? We need rejuvenation and skills provided by the creative arts.

The recent federal push for “STEM Education” highlights sciences, technology, engineering and mathematics as crucial for the future of our country. There has been a corresponding push from K-12 educators, universities, creatives and industry companies for STEAM – the addition of the “A” for the arts into the STEM acronym. The “A” in STEAM represents more than aesthetics. It encompasses fine art, design, writing and creativity, all of which hinge upon visual representation, communication and most of all, connection. The creative arts strive to make meaning – we personally invest ourselves when we recognize a greater narrative, a wider purpose. The “A” weaves the pattern connecting scientists, engineers and mathematicians back into the mainstream narrative of society and creates platforms for increased science literacy.

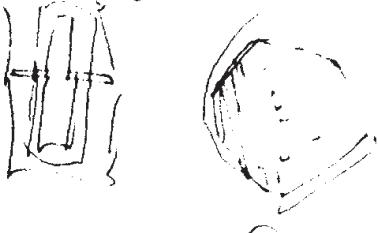
STEAM is not trying to make science “easier.” No one can do that. We are simply trying to reform teaching practices, culture and traditions that are hindering science today. The sciences need strong voices to champion their use and, more importantly, champion their accessibility so we do not lose bright and creative potential. We need to teach these voices how to present their work as relatable and exciting and relevant to the everyday lives of anyone they meet, regardless of background.

Science does not happen only in academic laboratories. Science encompasses everything we do, see and encounter in both the tremendous natural world and the ever-morphing technological realm. We must reintegrate science into the public consciousness by utilizing the creative arts, starting with the students we educate. By doing so, we empower students and the public to learn, teach and inspire in equal measure, in any way they dream, in any discipline the world has to offer.

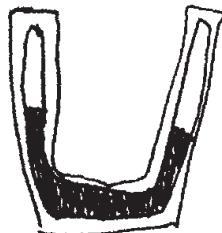
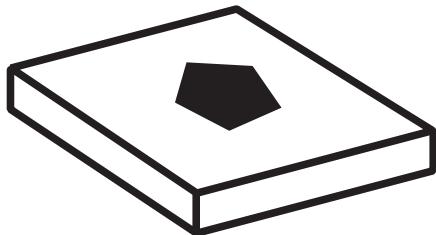
*This essay was originally published in the Brown Daily Herald.*

## WHAT OTHER PEOPLE NEED TO DO @ NIGHT

- GET A GLASS OF WATER
- GO TO THE BATHROOM
- COMING HOME LATE
- AVOID CORNERS OF FURNITURE
- GO DOWN STAIRS
- CHECK TIME
- NIGHTMARES
- PAINTINGS ON WALL
- CLASSY NITE LIGHT
- PORTABLE NIGHT LIGHT
- READING IN THE DARK



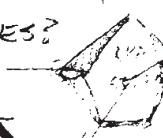
?



STEAM

Mark  
John  
Wendy  
Catherine

- MATERIALS & TEXTILES THING
- SPONSORED QUIKKIES?



E'SHIP 3  
QUIKKIES 2  
STEAM 1

KRI 4

VP OF PROGRAMMING

QUIKKIES: BE SPECIFIC

INFO SESSION BY  
WINTERSESSION

THERE WILL BE SNACKS

The original sketch  
from Ryan Flomerfelt  
Mather's sketchbook

**As STEAM extended our audience to other universities and communities far beyond college hill, we started to explore different communications options. We found ourselves looking for alternative, unique ways to explain our student initiative and mission. As it is often asked how we built our initiatives, we began exploring the idea of a STEAM “toolkit” for future STEAM architects. This toolkit, set for completion in spring 2014, will communicate our thoughts on STEAM, interdisciplinary learning, and arts advocacy. Its purpose is threefold; a manifesto of our STEAM theory, a catalogue of our workshops and progress, and a “how to” for STEAM beginners.**



*Clockwise from top left: RISD President John Maeda introduces Hiroshi Ishii; Ishii gets a standing ovation; Ishii speaks with beautiful slides; from left to right - Xin Liu, John Maeda, Hiroshi Ishii, Catherine Schmidt, Eliot Bassett-Cann, & Ryan Flomerfelt Mather pose after the talk.*

Before his talk on December 5, some STEAM members met Hiroshi Ishii to walk him to the auditorium where he would give his talk. The fog that day was thick enough to swim in, and although it was only 6pm the sun had already ceded into complete darkness. Ishii remarked that the last time he was on campus was at John Maeda's inauguration – also a rainy day. However, it may have been foreshadowing of his talk within which Ishii compared information to flowing water. When you are in the river, you can't see the direction, you have to really zoom out to see the circulation. If we had been able to zoom out at the talk we would have been able to see the cogs spinning in students' heads as they were inspired by Ishii's words.

Ishii walked us through the history of his focus and the conceptual frameworks within which he executed. His talk was peppered with hilarious yet insightful observations such as "Life is short, don't sleep too much" and "People say that when artists and engineers collaborate it is cross-disciplinary. That is not true". His talk was easy to access for RISD students because he

himself is such an artistic soul. When talking about painting he said "I miss the smell and the messiness". During one point in the lecture he interrupted his train of thought to very seriously ask the audience "How many of you have a sketchbook right now!?" As the majority of the audience raised their hands he smiled and said "Ah, good, that's art school". He had what we would like to call an artist's approach to human-computer interaction. This is evident in the way he discusses the limits of technology. "One thing that pixels cannot do is move stuff". Ishii's work is much more than pixels, though. He spent some time discussing inForm, an array of stepper motor-controlled pins that allow a user to visualize data and build 3d models manually, among other uses.

Hiroshi Ishii embodies what STEAM is all about. He approaches complex problems by moving seamlessly between disciplines. This allows his work to become relevant in innumerable applications and truly compelling. Thanks so much for visiting and we hope to see you again!



## Who are we?

### RISD STEAM

#### Catherine Leigh Schmidt

President

Graphic design, programming for web,  
typography, language

#### Eliot Bassett-Cann

Vice President of Outreach

Architecture, urban planning, emerging  
technology

#### Ryan Flomerfelt Mather

Vice President of Programming

Industrial design, new manufacturing  
paradigms, human-computer interaction

### Brown STEAM

#### Michelle Site

Co-President, founder

Biological systems, science learning,  
biotechnology, medical design

#### Hanna McPhee

Co-President

Biologically inspired design, analytical/  
creative, scientific process, design  
theory

#### Gabriel Filsinger

Vice President

Biological Physics & Chemistry, cancer  
research, mythology, multidisciplinary  
problem-solving

#### Lukas WinklerPrins

Vice President

Applied Math, interdisciplinary  
translation, physics, LEGO, furniture

