GRAFFITI RESEARCH LAB

They work in a lab, they make circuits, and they're electrifying urban art. We meet the Frankensteins of graffiti. But have they created a monster?

Graffiti has gone digital. Its tools and methods remained virtually unchanged for millennia, but two nerds in New York have just booted up a new age. No longer confined to spray paint and stencils, 'writers' now deal in microchips, LEDs and industrial-strength projectors. The revolution has spread from the lab to the streets.

It began at school. Evan Roth majored in software design but was obsessed with graffiti. His thesis at the Parsons School of Design in New York focused on how, as a coder, he could capture

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and recreate the art form's analogue charm. Roth managed to do so by videotaping the movements of a writer at work. He then projected the pen's trail onto buildings around New York. An impressive spectacle, but pre-recorded.

These projections caught the attention of Eyebeam – a non-profit arts centre in Manhattan specialising in technology. Roth was offered a

fellowship alongside James Powderly, who had been snapped up from a company that makes robots for NASA. It wasn't long before Roth's experiments intrigued Powderly, and the duo paired up in February 2006 to found the Graffiti Research Lab (GRL for short). With physical and virtual expertise, the circuit was complete and innovation began to flow.

Public gallery

GRL's innovation stemmed from the unique skills of its two partners, and it's these that make GRL so exciting. They've managed to move graffiti onwards through the application of technology. The two are contracted to innovate: "We're in this unique situation where our job is to brainstorm ideas. It's a really nice gig." purrs Roth. Crucially, Eyebeam's contracts stipulate that all work produced must be open source – so the GRL's projects must be shared with the public at every stage. Eyebeam's resources brought the GRL together; its mission statement ensured the lab's populism (and later popularity).

Early GRL projects had the crude brilliance of Victorian inventions. Electro-Graf was a mural with embedded LEDs, powered through

conductive paint. The result was impractical and unrefined, yet radical. Given a few hours for installation and testing, graffiti could now incorporate circuitry. The LEDs related to the mural's overall design and could be made to fade or blink. "But we needed a quicker way to 'get up' electronics in the city," says Roth. "We were more interested in tactical tools that harked back to traditional graffiti."

The GRL's next innovation wasn't quick to put up; it was instantaneous. Throwies were a blindingly simple hardware hack: a battery-powered LED taped to a magnet that's then thrown (hence the name) onto all manner of metal surfaces – from buildings to cars to bridges. "Throwies was the stupidest, simplest way we could cheaply embed electronics into the city," says Roth. The project flew through the blogs. Soon the GRL's own Throwie sessions were joined on YouTube by copycat films and, more interestingly, technological developments. "The project went beyond us," Roth says. "Other crews and activists on the web made modifications. Now you can find instruction sets for everything from flying Throwies to ones that blink Morse code."

Up in lights

While the social aspect of Throwies surprised and inspired, the GRL became frustrated by the project's over-simplicity. Throwies was an affordable means of public celebration but had little communicative potential. "People were just making buildings look like Christmas. We didn't want to just make stuff that looked cool on the internet – we wanted activists to use it," Roth sighs. In a cruel irony, the technique was hijacked not by subversives but companies like Coca-Cola. To the GRL, this was a travesty. Its open source methods were designed to engage and empower citizens to reclaim public space and challenge the hegemony of traditional media channels, not prop up multinationals.

The GRL's response was innovation. Night Writer was a board on a stick, pre-loaded with Throwies arranged into letters. The target metal surfaces remained the same but where Throwies were luminescent glitter, Night Writer was semiotic branding. The GRL showcased the
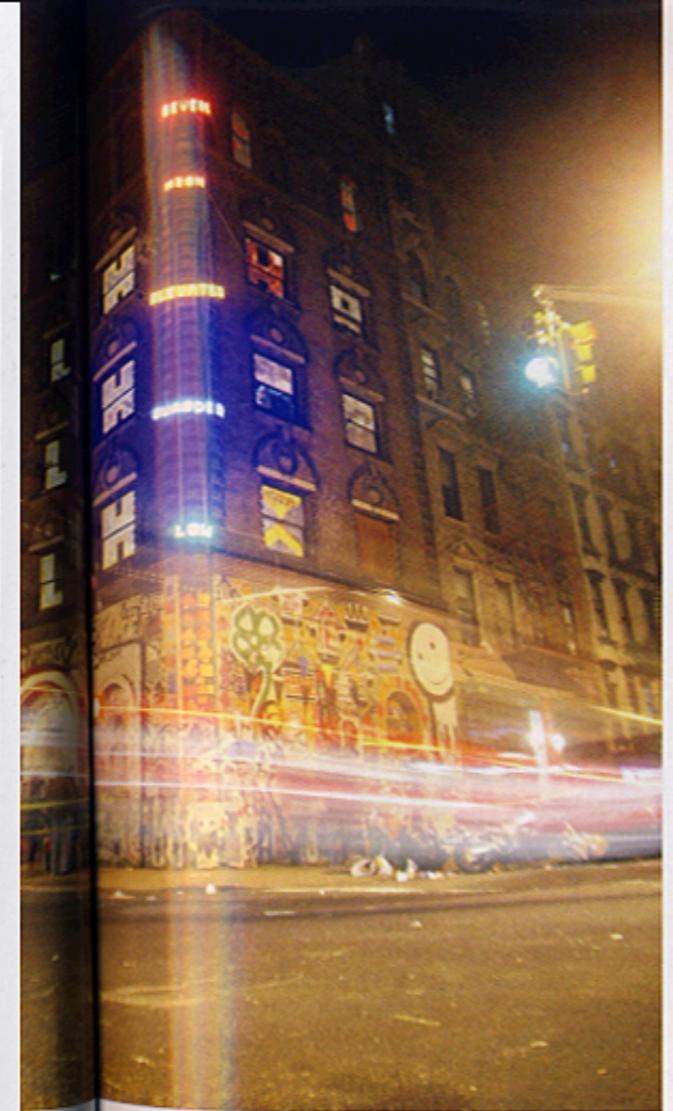
RIGHT: A GRL member holding the Night Writer: a device for stamping magnetic LEDs to walls, cars and anything with the right kind of metal.

BELOW: Make Throwies Not Bombs was a simple but eye-catching mini-campaign by the GRL.

RIGHT: The Night Writer pre-loaded with letters, and ready to be stamped onto a metal surface.

FAR RIGHT: The GRL collaborated with the Anti Advertising Agency to cover New York subway video screens with foam stencils. The project was one of GRL's cheapest and most effective.

CYBER ARTS

GRAFFITI

technology in a number of workshops around the US, including at Maker Faire, a Californian DIY technology festival. "You put all these cute lights in people's faces and they'd go nuts. Then you'd ask how they would use it. Suddenly all these hackers are thinking beyond their computer screens," remembers Roth. "We wanted to introduce ideas we'd learned from graffiti to hacker culture. It was like graffiti outreach."

These aren't empty statements, even if the soundbites appear pre-rehearsed. The GRL has collaborated with various communities, helping visually articulate their arguments on a public stage. AVONE was a graffiti writer impounded by

the NYPD. Unable to raise $4,000 for bail he turned to the GRL. The team wheeled out its projector for a show of solidarity that publicised the appeal. The GRL has also created more politicised installations, such as a Homeland Security scale written in Throwies, that illuminated (literally) the US terror alert system,

ABOVE: While touring LA, the GRL took the opportunity to brand itself onto iconic street signs.

LEFT: The Homeland Advisory Tower was a temporary installation on a New York apartment block. The GRL was attempting to highlight and lampoon the US terror alert scale.

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although not satirising it per say. When US liberals campaigned to impeach Dick Cheney, the GRL was roped in to help. The lab gave over its Laserwriter system to protesters, which projects in line with a laser pen's beam – real-time light graffiti. Unlike Electro-Graf, this was dynamic, intuitive technology that anyone could use for mass communication. Digital democracy writ large, one might say.

Laserwriter is a powerful tool for free speech – Jefferson would be proud – but its openness has led to some rather inane visual grandstanding. A projected mixture of profanities, corporate logos, 'Jihad' and even a dollar symbol can be seen in many of GRL's videos. It's a rather Americanised ▶

OPEN-SOURCE TECHNOLOGY

Sharing code with the community…

The GRL band about the phrase 'open source' like it's gone out of fashion. But what exactly do those words mean, and how could they possibly relate to graffiti? The key to understanding open source business models is to grasp the power of collective activity.

Open source began as a software movement. Staff running the Netscape browser realised that they could publicly release the source code of their software. Previously this code was seen as a valuable asset. What Netscape realised was that a global community of bedroom coders was more powerful than a single team of Californian Netscape engineers.

The GRL applies this thinking to everything it does. Rather than withhold technological secrets about its tools, the GRL publicises a how-to for each project, available free online. This has enabled the GRL's tools to evolve and increase the lab's profile. Open source works well in the world of graffiti as it's all about sharing ideas and making sure your technological innovations get used by as many people as possible.

The GRL has also offered readers of *Computer Arts Projects* a bit more of its open source experiment through the detailed instructions showing how to create laser-tagging projections in our tutorial on page 94.

Jackass-tech form of satire, hardly absurdist enough to sit alongside Peter Cook or Chris Morris's work. But this is, in a way, the flaw and beauty inherent to open source platforms and projects. The megaphone's flow is far more diverse than 'old media', but is it worth listening to? Moreover, the GRL cannot control who adapts its tools – whether corporate or anti-capitalist – or what they say with them. The lab's enemies are as close as its friends.

Freedom of speech

The GRL's own messages are regularly naive, but its underlying sentiment is spot on: more voices. It's a feeling that comes across speaking with the comfortably articulate Roth, too. Self-deprecating put-downs ("Graffiti writers have more interesting things to say than us") show the GRL can take criticism besides dishing it out. The lab's aim of "stopping people going home every night and turning on the TV," seems worthy in this context.

Seen as a small component of the wider visual landscape it's difficult not to support the GRL's overall output, even if you disagree with its individual statements. There is little artistic or political merit to a 15 storey-high dancing baby, for example. The once-omnipresent web animation was displayed when the GRL manipulated a building's light-studded façade. Some would argue that an uncurated loop of GIFs (of which the baby formed part) wasted this civic canvas. Those detractors would be missing the democratic pleasure of such an act, and the ridiculousness of seeing a green infant straight from Godzilla's crèche.

Not all the GRL's projects are brash, however. Light Criticism was a poetic little campaign that challenged New York's subway advertising. Black foam was pre-cut with letters and placed over the offending LCD screens. The holes let through light from the ads behind, obscuring the video and revealing stencilled letters. "Advertising = graffiti" was a problematic way of comparing the two forms of communication – are the GRL trying to say graffiti is 'bad' like ads? The project touched an optic nerve. "We're at war with advertisers, but particularly with guerrilla marketers – they're the bane of our existence,"

says Roth. "We fight a similar battle: trying to get people's eyeballs on your stuff without asking permission. Graffiti is more honest."

But the reality is that advertising is multiplying. As our environment becomes increasingly saturated, dissent is not only welcome but it is essential. An unhealthy monoculture could be further averted by an amendment to the law. What if every 50th billboard was given over to public art? It's no more absurd than the requirement that around one per cent of a new building's cost is spent on art – which, incidentally, the GRL exploited in Rotterdam. Artboard sites could even be rotated to spread the benefits.

Inspiration

In lieu of such a law, the GRL plays a valuable role. It operates on the fringe of criminality although, ironically, Eyebeam receives funding from some of the America's biggest companies. GRL's interventions and impromptu events are part of graffiti's lineage. Rather than visual pollution, its projects are enterprising community beacons that inspire others to act. "There's this old graffiti saying that it's easier to get forgiveness than permission," says Roth, "We live by that."

The GRL's Eyebeam fellowship is due to expire in a month's time. I'm not concerned about its future, because the lab isn't limited to the four walls that Powderly and Roth currently reside within. GRL is now global, with a satellite lab in Vienna set up with information from the GRL's own site. Open source thinking is here to stay and it's enriching everything, one idea at a time.

CONTACT DETAILS
http://graffitiresearchlab.com

"There's an old graffiti saying that it's easier to get forgiveness than permission. We live by that saying" Evan Roth

ABOVE: POV Cam is a low-fi tool to document traditional tagging sessions. It's simply a disposable video camera (they have everything in the States) attached to a visored helmet.

RIGHT: When the GRL took part in the prestigious Ars Electronica technological culture festival in Austria, they didn't anticipate meeting GRL Vienna, the organisation's first international chapter.

Corporate plagiarism is an ever-present annoyance for the GRL...

In January this year a guerrilla marketer in Boston put up electronic devices around the city to promote a new Cartoon Network show. A few worried citizens spotted the gizmos and thought they were terrorist devices. The police swept in and dismantled them, then charged the creative behind the campaign (an exchange student from Belarus) with attempting to create a panic. The Cartoon Network was eventually fined $2m and its head resigned. The perpetrator and commissioner from the marketing company responsible (Interference Inc) were both sentenced to community service. Initially, public reaction lambasted the marketers, but attention then swung to the police overreaction. Stickers soon appeared on Boston ATMs and parking meters, reading: "This is NOT a bomb."

What do the GRL's founders think? Here's what their blog read the day after it happened: '[This is] just more mindless corporate vandalism from a guerilla marketer who got busted. Interference Inc, welcome to the world of being misunderstood, scapegoated, demonised and wanted by the law. Still wanna be a graffiti artist?'

LEFT: Spotting the best location to 'bomb' is common to tagging with paint or light. The GRL managed to tag the Brooklyn Bridge, something impossible using traditional graffiti methods.

ABOVE: The Graffiti Research Lab might be a guerilla-style organisation but its branding is pretty slick. The team manages to inject character into its equipment by stencilling and customising.

ABOVE: The GRL may be run by two core members, but it takes people on-board for various projects, and is gaining international interest constantly. In a few years' time the GRL will be more of a global movement than a single-city team.

PROJECT YOUR TAG

Turn your laptop into a laser-tagging system for creating stunning light displays. THEODORE WATSON shows you how to get up and running…

The following guide will help you to create large-scale projections using Graffiti Research Lab's open source *Laser Tag 2.0* software. It uses a camera to track the position of a laser pointer and then projects the tag back onto the surface to allow you to write massive 'tags' across hard surfaces. To build such a setup you'll first need a fast laptop (PC or Mac), ideally with a dedicated graphics card that can connect to an external monitor. Then you can download the necessary open source software from **www. graffitiresearchlab.com**.

Next you'll need a video camera that can connect to the laptop. Equipment with manual controls tend to be a lot better at tracking the laser than ones that automatically adjust the image depending on how bright it is. You'll need a projector (anything over 2,000 lumens will work well) to display your image and a laser pointer that's between 5MW and 80MW in power.

For this guide we're using an Asus F9S laptop with a Logitech Messenger camera, a Benq 2,500 lumens projector and a 70MW green laser pointer. For larger scale projects you'll need a brighter projector and a better camera.

Please remember, laser tagging can be extremely dangerous. The laser-tagging system described here should only be used under controlled conditions, away from public areas and never against buildings with people inside. If you want to experiment, please only use projectors less than 5MW in power. Laser tagging is also illegal; please only try it on your own property or with the property owner's consent.

For more information on laser tagging and to see the software in action visit **www.muonics.net**.

Written by Theo Watson, www.muonics.net. Images on this page courtesy of Graffiti Research Lab. L.A.S.E.R Tag credits: James Powderly, Evan Roth, Theo Watson, Leon Reid, Hell and the Mobile Broadcast Unit (MBU) with L.A.S.E.R. Tag Payload.
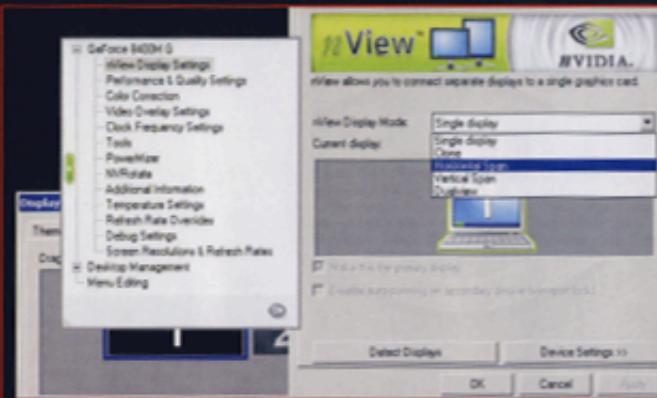
You can download the *Laser Tag 2.0* software from **www.graffitiresearchlab.com**.

Part 1: Set up a projector
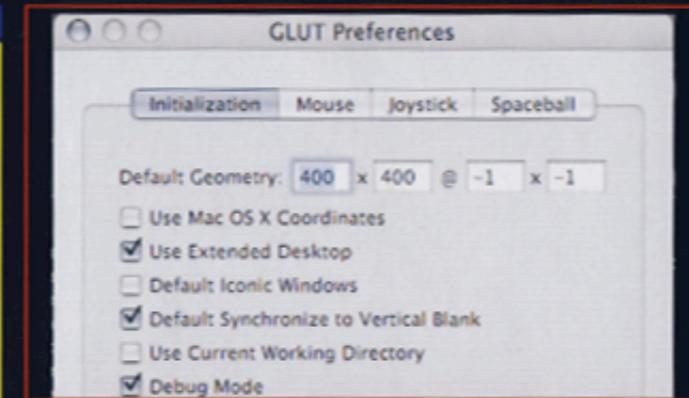
Start by setting up the *Laser Tag* software on a Mac or PC…

1 Setting up the projector on a PC: The *Laser Tag* software is set up to work with the projector acting as an extended desktop to your laptop's main display. If you have a PC laptop and an NVIDIA graphics card, you need to set your display to use Horizontal Span mode and set the total display dimensions to 2048x768. If you don't have Horizontal Span, look into Realtime Soft's UltraMon which works with all graphics cards.
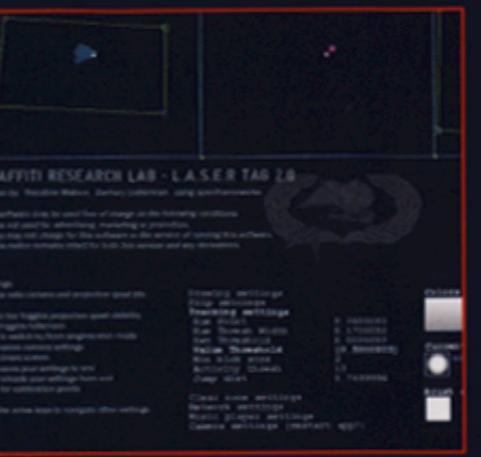
2 Setting up the projector on a Mac: Set up the projector to be to the right of the desktop and then launch the Laser Tag application, type Command + [,] then check the box that says Use Extended Desktop. Once this is done, quit the application and the settings will be saved to your preferences. Set both your laptop's display and the projector to 1024x768 and you're ready to go.

Part 2: Create a laser tag

Experiment with cool laser-tagging effects in your home…

1 To effectively track the laser you need to disable the camera's Auto White Balance, Auto Exposure and Backlight Compensation. In the *Laser Tag* software you can hit the [C] key to bring up the camera settings box. Go through the settings and set as much as possible to manual.

2 Now you're ready to align the camera and the projector. Run the *Laser Tag* software and hit the [F] key to enter full-screen mode. Now press the Spacebar to show the edges of the projection area. Use your mouse to drag the corners of the white projection quad so it fits the area you're projecting onto. Hit the [S] key to save your settings.

3 In the top-left corner of the screen you can see the video panel of the camera. Make sure the camera is covering the whole projection area and is in focus. If you can see the four corners of the projection quad with the camera, drag each corner of the yellow camera quad so they line up. If the camera image is too dark to see the corners, get a friend to beam the laser at each corner and drag them in that way. Save your settings.
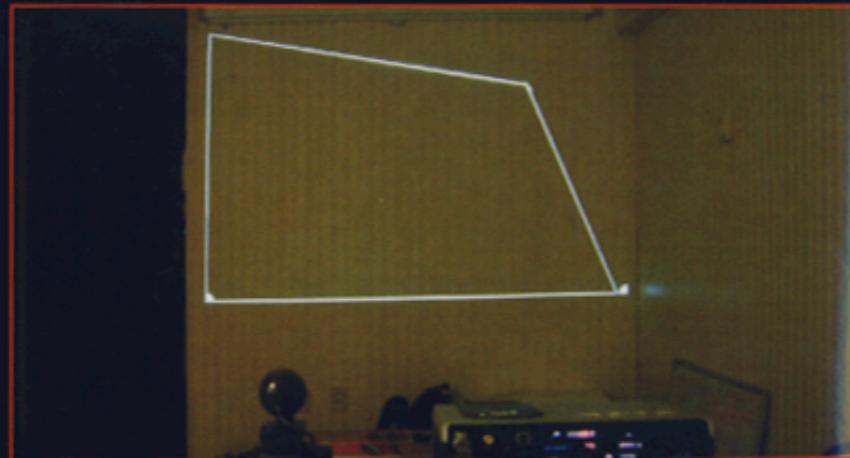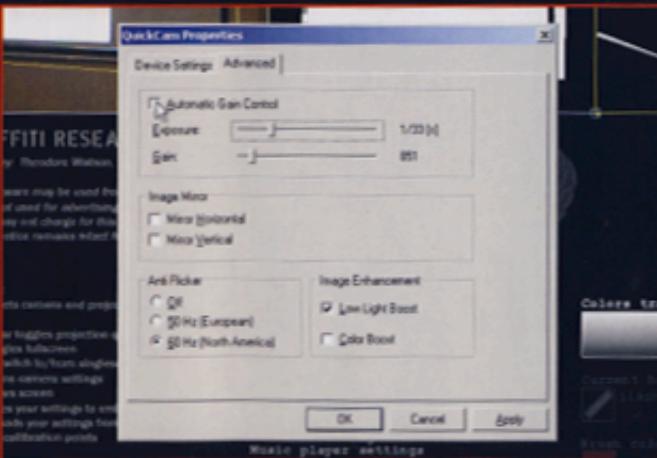
4 In Tracking Settings start off with saturation at zero. See if you can distinguish the laser just by adjusting the brightness (value) threshold alone. Note: Reducing the brightness in the camera settings to the point where only the laser is visible can make this easier. If you are still seeing a lot of white noise in the tracking panel, try using the Sat Threshold to track by colour. Hit the [S] key to save your settings.

5 You should now be able to tag. When you're tagging, the projected 'paint' should always appear to come from the location of the laser point. If this doesn't happen, repeat Step 3 to re-align the camera to the projection area. If the tracking seems jerky, try adjusting the tracking settings until the motion seems nice and smooth.

6 You can clear the projected tag manually by pressing the [D] key, but this can be inconvenient. Instead, set up an area just outside the 'work' area as a button that clears the projection when hit with the laser. Enable this function in the Clear Zone Settings that shows up as a red box in the video panel. Adjust the x, y, width and height properties and position it somewhere outside of the projection area.

7 Now it's time to customise your tags. There are three basic brushes – the PNG, the graff letters and the vector – which are selectable in Brush Mode. The PNG utilises user-created PNG files to draw with. Add your own brushes by saving them to the Data/Brushes folder. Then use Which Brush Image to switch the image, and Brush Colour to change the drawing colour.

8 For added realism, go to the Drips Settings and bring your tags to life as you write/draw. Once enabled, you can adjust the level of 'drippiness' and the speed of the drips with the other settings.

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