MACHINE PROJECT

Guide to

WORKSHOPS

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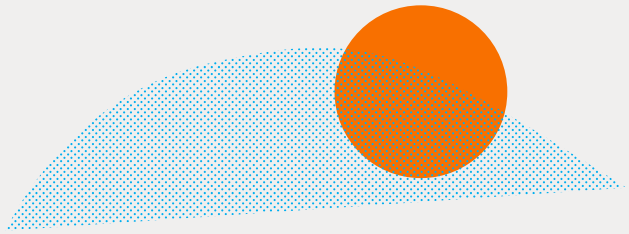

Introduction

Hi! I'm Mark Allen. As Machine Project's founder, primary director, and curator, I've produced hundreds of interactive artworks, performances, and workshops over the past fifteen years. Some were successful; others were terrible and embarrassing. With this tool kit and its two companions, I'd like to help you to maximize the successes and minimize the embarrassments (though those are helpful, too).

Machine Project, founded in 2003, is a nonprofit presentation and educational space investigating art, technology, natural history, science, music, literature, food, and whatever else humans like to do. Machine began as a place for me to sleep, experiment, make a mess, and host my friends' work. Since those early days, we've grown into an internationally-recognized organization working with both artists and institutional partners to create the conditions for new ideas to emerge into culture.

After many years of practice, I've distilled some basic ideas, philosophies, and techniques for workshop-based programming into this tool kit.

In The Beginning There Was The Electromechanical Mirrorball Sculpture

An obscure desire to build electromechanical mirrorball sculptures back in grad school led to my interest in workshops. I didn't know the first thing about electronics, and I couldn't find anyone to teach me, so—slowly and with great pain—I taught myself. Soon, my friends were coming to me with their own questions about electronics, and I realized that in roughly ten hours I could teach someone what it had taken me about three years to learn. It turned out I was better at explaining this stuff than actually doing it myself, and I learned much more about electronics in the process. And thus was born my interest in teaching both as a form of personal growth and as something that could help fellow artists.

As demand for these informal tutorials increased, I realized it would be more efficient to teach people in groups. This experience came in handy when, several years later, I signed a lease on the

future Machine storefront without a solid strategy for how to pay the rent. Drawing on my informal experience with sharing know-how with friends, I began offering paid workshops in electronics and computer programming at the new space. Not only did this help keep the lights on, it was a first step in building the Machine community.

Now it's fifteen years later. Machine has offered hundreds of workshops—see the end of this document for a comprehensive list—and my focus has shifted to teaching seminars on the nonprofit and institutional strategies I've developed through my experience running Machine. These seminars cover how to start an art space, how to curate events, and—the subject of the tool kit you are presently reading—how to develop and teach workshops.

Why Workshops?

Before we get down to logistics, let's talk about why you or your organization might want to start a workshop program. As with most things in life, the typical reasons are love, money, or some combination of the two.

Love: If you are passionate about something, the workshop is a perfect platform for sharing that passion with an engaged audience. Sharing knowledge or skills with other people feels good, and gathering people in a physical space makes for a deeper, more personal form of teaching than a YouTube tutorial or a book.

As artists, one of our goals is to make our world a more interesting place (right?), so the more people who know how to do interesting things, the better. Workshops are a way of multiplying the culture's ability to do those interesting things. In a circular, slightly selfish way, sharing knowledge and skills increases the odds that there will be lots of wonderful art for you to look at.

Also, I think there is a basic, primal human desire to bring people together. I don't want to overstate this—workshop participants probably won't become best friends who stage annual reunions with cake and songs—but time spent learning together can foster a sense of community. Workshops, in their modest way, contribute to a more humane civic culture.

Money: At Machine, our workshop program is modestly profitable—it is a small but significant piece of our funding pie. For the artists who teach our workshops, the same applies. We aren't able to provide a full-time living for instructors, but the extra income helps.

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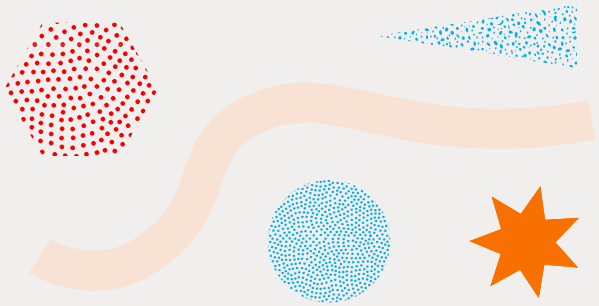

What To Workshop

At Machine, we program across a wide spectrum of workshop topics and styles, from the straight-forward and practical—like Basic Electronics for Artists with Casey Anderson—to the more idiosyncratic, like the Ghillie Suit Construction Workshop with Hanna Rose Shell. Sometimes the form of the workshop will be tightly-structured and practical while the content is ridiculous and fun; or, conversely, the tone might be loose and goofy despite a dry or serious topic.

You may find that you like a similarly wide spectrum, or that you want a more focused approach. A lot of this will come down to your organization's mission. We talk about this in more detail in our tool kit on How to Start Your Own Space.

Get Specific

In curating our workshops, we look for niches that haven't been filled. We look for subjects too obscure or controversial for larger institutions to bother with. Because of overhead expenses and institutional sluggishness, a university probably won't offer a class in a subject only a dozen people care about, like Remote-Controlled Hot Air Ballooning With Cats. This is fantastic news for a small, nimble space like Machine—we'll gladly take those twelve eager cat-air-ballooning enthusiasts off their hands. We can do it cheaper, with less bureaucracy, and with fewer restrictions on content; we can take risks those institutions can't, and cater to an audience that isn't being served.

And from a marketing perspective, I've learned that the tighter the focus of the workshop, the easier it is to convince people that this is going to be a special experience worth attending. A workshop on fermentation will attract a bigger crowd than one on "food." A miso workshop will bring a bigger crowd than one on fermentation. And so on...

What's New?

Being small and nimble also comes in handy if, like Machine, your organization focuses on new or emergent topics and technologies. Lack of institutional

bloat means we can respond to and share new ideas quickly, often long before larger organizations have had a chance to process them.

Your Niche

Our workshop program focuses on teaching specific skills, with a strong bias toward whimsical cross pollination and making with technology. This is certainly not the only approach—indeed, some of our favorite peer organizations have created fascinating alternative models. For example, the Public School focuses on communal self-education—anyone can propose, teach, or participate in a class. And the Best Friends Learning Gang takes this model further, hosting Amateur Hour workshops that have no instructor at all—people gather to research and learn together in a hierarchy-free environment.

So, what's your niche? Do you want to be out front, addressing new ideas and technologies before they filter into the larger culture? Do you want to focus on community projects? Experimental cuisine? Puppets? As you're developing your workshop program, think about where you want to fit in.

Teachers

What we look for in a teacher is a love for their subject and an enthusiasm for sharing that love with other people. The specific pedagogical approach or level of expertise is not as important as the ability to help participants overcome their natural resistance to new ideas and unfamiliar environments. We want Machine workshop students to leave with the confidence and enthusiasm to continue learning on their own.

Some of our best teachers and presenters are enthusiasts first and experts second. Under the right circumstances, a workshop run by teacher whose expertise is only a step or two ahead of the participants can be fun and illuminating. This helps the instructor to bring empathy to the process—it's easier to imagine what a beginner needs to know if you were recently a beginner yourself.

In addition, by taking a chance on artists without much teaching experience, we're building a talent pool and enriching the ecosystem beyond our doors. It demands a bit of extra work and support on our end (i.e., time and patience), but we think it's worth it.

(For a more detailed discussion of choosing your presenters and collaborators, please see the Machine Guide to Curating and Planning Events.)

Money

Should you charge for your workshop? And if so, how much? And while we're asking difficult questions, how long is a piece of string?

Cute koans aside, there truly are no hard-and-fast answers to these questions. You can offer workshops for free, you can charge for cost, or you can charge more to help pay for operations and other programming. These days we charge for most of our workshops—roughly $20 per contact hour per participant, plus materials—but we've tried all three of those approaches and there are valid arguments for each. Here's what we've learned:

Charge Nothing. You might feel that sharing knowledge is a social good and don't want anyone to miss out because they can't afford it. Or maybe you don't like the hierarchy implicit in a paid student-to-instructor relationship. Machine used to favor this model, and we still offer free workshops when appropriate, but overall we've found it's not a good fit for us. Here are some of the issues associated with the free model:

- Compensation for instructors will have to come from somewhere
- Money for your overall operating expenses will have to come from somewhere
- Many, many people who sign up for an event—workshop or otherwise—will not attend if they did not pay for it; in our experience that number is as high as 50% of registrees

On the other hand, free workshops do have a few benefits:

- They potentially open up teaching and learning to a wider audience
- They reduce the risk for participants to try something new

Charge Enough to Break Even. This is our favorite model. Good things about this model:

- If you have other funds to cover your operating expenses, the stakes are lower in terms of having to bring in big groups every time you do a workshop
- It allows you to fulfill your mission of enabling risk and radical programming while keeping the lights on

Charge Enough to Make a Little.: These workshops pay for themselves and help refill the coffers, allowing us to fund less-profitable programming. You can usually charge a little more money for workshops in higher demand. These often tend to be on topics that are less fun, but offer practical/useful skills like coding or electronics.

When calculating how much to charge participants, you should also consider a workshop's transactionality. This is a fancy word for a simple concept: the more directly useful the skill you're teaching, the more money people we be willing to part with to learn it. To wit: you can charge more for a coding class than a sleep yoga class. (Take our word for it—we've taught both.)

Compensation For Instructors

We pay our instructors. We think it's the right thing to do. If you decide to do the same, the amount of compensation will depend on factors like your local economy and your organization's budget. We've tried a few models for instructor compensation, each with its own list of pros and cons for the instructor, the organization, and the participant. Let's take a look.

For the vast majority of our workshops, we pay the instructor $40 per contact hour. Since we charge participants $20 per contact hour, attendance above two students results in Machine keeping more than the instructor. This is why we have such a fantastic collection of yachts. Just kidding—the extra funds help us to cover marketing and promotion, operational expenses, and—more importantly—support instructors in developing and presenting their ideas.

For some workshops, we split the proceeds evenly with the instructor. We rarely use this model because it ends up badly for an instructor if not enough students show up. Assuming we're using the aforementioned $20 per contact hour plus materials student fee model, it might take six or more participants for the instructor to make the same $40 they would have made with the fixed-rate model.

With this model there is also the assumption that the instructor will take on marketing and promotion responsibilities. This works well if the instructor has a good network and lots of experience. But it can result in the instructor spending time and energy on marketing that would be better spent developing the actual workshop, which can mean a less ideal experience for the participants.

Ultimately, we reserve this model for experienced instructors we've worked with before.

There are times when Machine decides a workshop is worth a slight loss. On these occasions, we will give the instructor more than half of the proceeds. We do this with very experienced instructors, or instructors who are bringing in very specialized equipment or materials.

A Few More Words About Free Workshops

When first starting out, I taught a free, four-session electronics workshop. For the first session, I'd have a dozen eager students. By session two, that number was down to six. By the last session, I was lucky if two people turned up. This was a bummer. So I started charging a nominal fee for the classes. Like magic, people not only stuck with it for all four sessions, they actually seemed more engaged.

There are two things at work there. First, I was effectively doing a little presorting—obstacles like a fee

and online registration help to eliminate the drop-outs before they even show up. Second, by charging a fee I was creating the perception of value. When people pay for a service, they tend to internalize that it has a tangible worth. This reflects a deep psychological attachment to capitalist values which kind of makes me sad, but it does help people get more out of the workshops.

That said, we do still offer the occasional free workshop, but now we plan ahead for the 25% to 50% of people who won't show up.

Marketing

Ignore the thousands of books on the subject—here are the two things you need to understand about marketing:

Get the word out to potential participants of your workshop. Your audience needs to know about your workshops in order to attend them, and you need decent attendance in order to have a successful workshop. We've found it useful to think about marketing during the workshop design and development process, rather than as an afterthought. Consider the range of people that might be interested in your workshop. This often may be a different and new demographic than your existing audience.

Get the right word out to potential participants of your workshop. Describe the workshop alluringly, but accurately, with enough detail so that participants know what they are signing up for, and what it might require of them. Do you want to deal with a classful of confused, disappointed, and annoyed cartography enthusiasts wondering why they're being taught how to build a lie detector? No, you do not. By the time you're ready to hit send on your email blast or post your tweet, you should have a rock-solid idea what you are offering, who you think will be interested in it, and what the value proposition is for those people.

For more on using narrative hooks and other marketing tricks, please see The Machine Guide to Curating and Planning Events.

Space And Gear

When programming a workshop, take your space and gear limitations into account. We present most of our workshops in our smallish storefront space. Beyond some basic computer hardware and A/V equipment, we don't have a lot of gear, which is mostly by design—we save on hardware purchase, maintenance, and insurance costs, and we don't get locked into a specific kind of programming because of sunk investment costs. That said, we do have to think twice before committing to a workshop we simply can't accommodate, even if we would like nothing more than to host a dumpster scuba class.

Programming in Other Spaces

Machine sometimes programs workshops in spaces other than our own. There are any number of reasons why your organization might consider doing the same—maybe the space is large enough to accommodate that dumpster scuba class, or maybe they have an audience that complements or adds to your existing audience. These are fantastic reasons to do it!

However, there are a few special considerations to keep in mind. When offering a workshop at another space, the customary audience for that space may not know or care about you or your organization's idiosyncratic mission. This can make it harder for audiences to understand the relevance and tone of a given workshop. And that can lead to both poor attendance and disappointed attendants.

And remember that whatever the potential benefits, an unfamiliar space brings with it a new, unknown set of logistical concerns.

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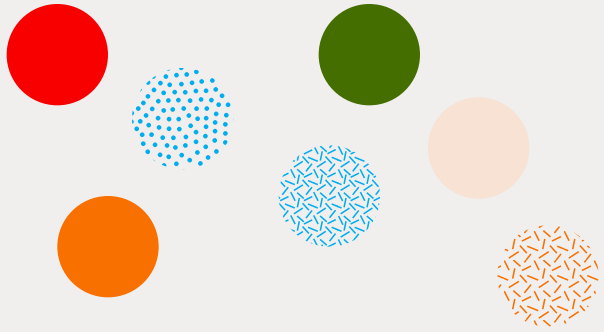


Types Of Workshops

There are approximately a gazillion ways to teach a workshop, but we at Machine have simplified that list to three. Here they are, in ascending order of complexity:

1) Presentation. This is a lecture or similarly didactic format. This model offers the least in terms of student participation—attendees get talked at by someone standing at the front of the room. A slightly more advanced version of this is The Demo, in which someone who knows how to do something does it in front of a class while narrating the action. Remember that you're competing with books, YouTube, and online tutorials, so It's important to maximize interactivity when presenting a demo or lecture by leaving lots of time for questions and discussion.

2) Hands-On. In which you teach a specific skill or information set with fixed learning outcomes. Ideally,

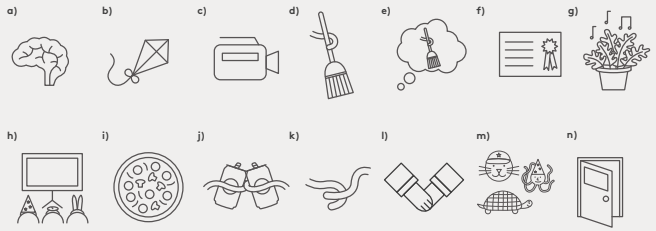
students leave the class with something they made—perhaps a computer program, a sweater made of garbage bags, or a self-healing robotic combat system.

3) Teamwork. The most complex model is the good old-fashioned group project, where participants learn by making something as a team. We love this model for its implicit horizontality and potential for building group morale and community. It's the most interactive and gives the participants the best chance to learn from each other. It also requires the most skillful preparation and organization to ensure that all participants have a positive outcome, as well as a facilitator with expertise.

With any form of workshop, we recommend prioritizing student/instructor interaction. Bear in mind that there are millions of how-to videos out there—the advantage of teaching a workshop in a physical space is that it allows people to learn from other humans, whether it's the instructor or other students.

Audience

Why would someone sign up for a workshop? Again, there are roughly a gazillion reasons, but we've broken them down to a manageable, bullet-pointed list. Some common motivations for attending a workshop are:



A. Learning knowledge or skills
   B. For fun
   C. For work
      D. For a job they already have
      E. For a job they would like
F. Gaining a credential (which may or may not have anything to do with learning knowledge or skills)
G. Having a new experience
H. Spending time with people
   I. Social
      J. Spending time with friends
      K. Meeting new people
L. Professional
   M. Networking within an existing community
   N. Exposure to a new community

Our workshop participants tend to fall into one of the following three groups:

- People who want to a learn about a specific topic or develop a specific skill
- Artists and makers interested in moving their work in a certain direction
- Naturally curious types who embrace learning as a pastime—they attend not with a concrete goal in mind, simply to explore something new

In Machine's early days, our workshops were geared primarily towards the first type of participant. These folks are signing up with specific goals in mind, so this type of workshop tends to be practical and tightly-structured. As our mission and interests have evolved over the years, however, our focus has shifted towards serving the third type of participant—the naturally curious types who just want to try new things. These workshops are generally more fun but less remunerative. In other words, people will pay a decent fee to learn basic coding, but not quite as much to explore paleolithic net making. (See our section above on Money.)

Decide who your workshop is aimed at—novice, pro, enthusiast, dabbler—and make sure to communicate that clearly. You will have far fewer frustrated workshoppers on your hands if the event they show up for is the one they expected. But no matter how well you communicate, it's a good idea to be prepared for students all along the spectrum.

Beginners and Empathy

Most subjects or skills worth learning have steep learning curves, leaving the uninitiated feeling confused or discouraged. Our mission at Machine has been to help get people over that initial curve, show them the basics of the given topic or skill, then set them loose to learn more on their own.

When teaching beginners, empathy is key. Think back to what confused you when you were first learning whatever it is you'll be teaching. This can be difficult if you've been working in a field for years or decades—it's likely you have some unexamined assumptions about what qualifies as common knowledge. Take some time to identify the concepts that seem obvious now, but actually took you a semester to master. As you teach a class take note of what people find hard to understand. Use this information for the next time you teach the class.

Also try to pinpoint the barriers to learning that some of your students might encounter. Some potential impediments to learning will be very obvious (like, don't plan to teach fire breathing to pyrophobics), but many are more subtle. Does your workshop require manual dexterity? Is it appropriate for children? If so, what age level? Would your workshop be difficult for someone who hates donuts? Identify these potential impediments and advertise your workshop accordingly.

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Before, During, And After Your Workshop

Below you'll find some handy checklists and questions to review at each stage of your workshop.

Before The Workshop

Fortune favors the prepared! Here are some questions we use when preparing a workshop:

- What are the building blocks of this skill?
- What are the larger concepts a student will need to grasp?
- What questions did I have when learning or applying this skill?
- How can I break the information up into easy-to-understand steps?
- In what sequence do these steps need to be learned?
- How long will it take to teach this skill?

A note on duration: Underestimating how much time a workshop will require is the most common mistake we've grappled with. Expect things to take longer for your students than you think, and don't attempt to squeeze a one-day workshop into one hour. A good strategy is to prepare a very compact core of material and content, but have extra material ready to go in case you have extra time.

Before The First Class Meets

- Prepare inspirational examples of work made using the skills you'll be teaching
- Print handouts or thumb drive downloadable material for easy distribution
- Minimize specialized equipment and materials needed, keep costs down for students
- Order materials needed, typically with 10% extra for contingencies
- Have all software/hardware tested for whatever equipment people are using
- If the workshop requires a programming environment or other tools, consider a pre-class meeting to help everyone get the tools installed
- Break content down into defined, manageable modules that can be completed in time, and add on modules in case things go fast, which they will not

Before Each Class Meeting

- Adjust program based on how quickly or slowly the last meeting went
- Organize and package materials or handouts for that day
- Arrive one hour early to set up space

Before Publicizing

- Articulate the skill-level and prerequisites of the class
- Calculate how many students you need to make money and decide when you will cancel the class if you don't get enough enrollment
- Write a snappy, accurate class description
- Prepare a class-by-class outline of what students will do
- Build and test all demos and class projects to verify they work

During The Workshop

Class Structure

- Start with an overview. Explain the nature of the skill you are teaching. This should be brief—under 15 minutes
- Help students to visualize how the skill or technology can be applied by showing and discussing concrete real-world examples
- Alternate between group instruction and individual work. Keep lecture or group discussion down to less than 20 minutes between the activities

- Take time to talk with each student during individual work—get to know them and pay attention
- Gradually deal with questions/people along the way
- When you're giving your first workshop(s), it's good to work in a team or employ a teaching assistant

Workflow

- Plan a simple workshop, then improvise depending on group progress. Prepare for a group that might be challenged by the material, but have extra content ready in case your group moves quickly
- Start with an icebreaker to help your group relax and get to know each other a bit—this can be as simple as having the class share their names and reasons for taking the workshop
- Make sure students have a clear goal or task during the individual work; have them write it down
- Make sure everyone has something to work on before helping individuals who are having difficulties
- Deputize the fast learners to help teach slower students—if someone has finished a step before everyone else, ask them to help a neighbor who might have questions

After The Workshop

Congrats—you've made it to the finish line! Well, not yet, actually. Your work isn't done until you assess how things went. A lab report is a fantastic way to take stock of what worked and what you can improve for next time. Answer the following questions after each workshop.

- What happened that was unexpected?
- What went well? What didn't?
- What problems did students encounter? How did you solve them?
- Did you make it all the way through your prepared materials?
- What feedback did you get from attendees?

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In Conclusion...

You've made it all the way to the end of this guide, so I hope you're feeling suitably inspired and encouraged to create and program your own workshops. Go do some stuff!

Appendix A: What was that workshop?

Use this survey to think about workshops you have taken and remember what they were like. Distribute it to your staff and get their input. Poll your community. Adapt to suit your needs as necessary.

What was the workshop called?

Who presented it?
What was it about?
How many people were there?
How many participants were there?
How many instructors were there?
Did the instructor-to-student ratio work?

Where was it?
Was there enough space for the number of people?
Was there enough equipment or supplies for all of the participants?

When was it?
How long was it?
How many sessions were there?
How long was each session?
How was the time? Just right? Too long? Too short?

How was information presented?

Why did you take it?
How much did it cost?
Workshop?
Supplies?
How was the cost? Just right? Too much? Too little?
What worked and what didn't work?
Overall, was it a worthwhile experience?

Appendix B: A Chronological List of Workshops Presented by Machine Project

1. max/msp/jitter, with Brian Crabtree, 2005
2. Introduction to Electronics for Artists, with Mark Allen, 2005
3. Electron Wrangling for Beginners, with Mark Allen, 2005
4. Introduction to Processing, with Krister Olsson, 2005
5. Electron Wrangling for Beginners, with Mark Allen, 2005
6. max/msp/jitter, with Brian Crabtree, 2005
7. Hyperbolic Crochet, with Daina Taimina, Christine Wertheim, and Margaret Wertheim, 2005
8. Machine sewing, with Mercedes Teixido, 2005
9. A build your own noise thing workshop spectacular, with Silent G, The Logic, and Mark Allen, 2005
10. Good walls make good neighbors â€" an introduction to basic construction, with Ryan Taber, 2006
11. Programming Digital Media in OSX with Python, with Andy Kopra, 2006
12. Circuit design and fabrication = sound objects, with Brian Crabtree, 2006
13. Web design for N00bs, with Jason Brown, 2006
14. Machine Sewing 101, with Annie O'Malley, 2006
15. Graphic Design for N00bs, with Ben Benjamin, 2006
16. Max/Jitter, with B. Dean, 2006
17. Spooky Projects — Introduction to Microcontrollers with Arduino, with Tod E. Kurt, 2006
18. Square waves for beginners, with Mark Allen, 2006
19. Machine Sewing 101, with Leah Piehl, 2006
20. Machine Sewing 101, with Julie Schworm, 2006
21. Introduction to Solar Robotics, with Mark Allen, 2006
22. Graphic Design for N00bz, with Ben Benjamin, 2007
23. Sewing + Electronics, with Syuzi Pakhchyan, 2007
24. Fabrications and Alterations: Used Garment Couture (Intermediate sewing), with Ellen McCartney and Jessica Hutchins, 2007
25. MAX/MSP, with Brian Crabtree, 2007
26. Felt+Circuits, with Kelli Cain & Brian Crabtree, 2007

27. Machine Sewing 101, with Annie O'Malley, 2007
28. I need a website now! Basics of building your own webpage, with Jason Brown, 2007
29. Max/MSP class, with Jonathan Zalben, 2007
30. Tubez 4 Noobz, with Jason Brown, 2007
31. Webhosting Bootcamp, with Jason Brown, 2007
32. I CAN HAS VAR? with Mark Allen, 2007
33. Electronics for Artists, with Mark Allen, 2007
34. Build a blubber bot, with Jed Berk, 2007
35. Introduction to Processing: Computer Programming for Artists, with Mark Allen, 2007
36. Introduction to PD, with Lewis Keller, 2007
37. Machine Sewing 101, with Annie O'Malley, 2007
38. Animatronic Ghost Workshop, with Joseph L. Girandola, 2007
39. Introduction to Robotic Art, with Douglas Repetto, 2007
40. Do-It-Yourself Community Wireless Networking AKA How the Internet Works, with Ryan O'Toole, 2007
41. Bionic Arduino! Introduction to Microcontrollers with Arduino, with Tod Kurt, 2007
42. Tissue culturing workshop, with Oron Catts & Ionat Zurr of SymbioticA, 2007
43. Intro to Electronics + Circuitbending, with Phil Stearns, 2007
44. Introduction to Microcontrollers with Arduino, with Mark Allen, 2007
45. Machine Sewing 101, with Annie O'Malley, 2008
46. Living Kitchen Workshops, with Nance Klehm, 2008
47. Ongoing Tabla classes through mid-April!, with Robin Sukhadia, 2008
48. Daal 101: Cooking Workshop, with Saroj Sukhadia, 2008
49. Henna Workshop, with Saroj Sukhadia, 2008
50. Instrument Invention Workshop, with Walter Kitundu, 2008
51. Felt + Circuits Workshop, with Brian Crabtree and Kelli Cain, 2008
52. Max/MSP/Jitter, with Brian Crabtree, 2008
53. Basic Electronics, with Lewis Keller, 2008
54. Machine Sewing 101, with Annie O'Malley, 2008
55. Basic Crochet + Amigurumi Workshop, with Cheryl Cambras, 2008
56. Ghillie Suit Construction Workshop, with Hanna Rose Shell, 2008
57. Unix for N00bz: How to Access Your Files From Anywhere, with Ryan Oâ€™Toole, 2008
58. Introduction to Processing, with Chandler McWilliams, 2008
59. Machine Sewing 101, with Annie O'Malley, 2008
60. Intermediate Circuitbending, with Phil Stearns, 2008
61. Introduction to Arduino, with Jacob Tonski, 2008
62. Intro to Soldering, with Mark Allen, 2009
63. Introduction to Crochet, with Cheryl Cambras, 2009
64. Motors and Mechanisms, with Jason Torchinsky, 2009
65. Machine Sewing 101, with Annie O'Malley, 2009
66. Intro to Arduino, with Elisabeth McMullin, 2009
67. Intro to Max/MSP, with Lewis Keller, 2009
68. Intro to Processing, with Chandler McWilliams, 2009
69. Intro to Soldering/Build Your Own Synth workshop, with Palle Henckel, 2009
70. Computer Music Gaming: Intro to SuperCollider, with Ezra Buchla, 2009
71. Field Recording Workshop, with Clay Chaplin, 2009
72. Max/MSP for monome users, with Brian Crabtree, 2009
73. Basic Electronics Class, with Lewis Keller, 2009
74. The Command-line Ecosystem hidden on your Mac, with Gregory Whitescarver, 2009
75. Machine Sewing 102: Pattern-making and Alteration, with Annie O'Malley, 2009
76. Introduction to JITTER: Visual Media in Max/MSP, with Perry Hoberman, 2009
77. Programming the iPhone 101, with Chandler McWilliams, 2009
78. Musical Soldering Workshop: CRITTER Edition, with Mark Allen, 2009
79. Monster Prop and Costume Workshop, with Hunter Jackson, 2009
80. Build Your Own Hydrophone Workshop, with Clay Chaplin, 2009
81. Beginning + Intermediate Tabla, with Robin Sukhadia, 2009
82. Make Your Own Pizza Dough & Oven-building Workshop, with Michael O'Malley, 2009
83. Kraut Fest 2009!, with Mark Frauenfelder, Erik Knutzen, Kelly Coyne, Jean-Paul Monsche, and Oghee "Granny" Choe, 2009
84. Sensors and Pattern Recognition, with Heather Knight, 2009
85. Monster Prop & Costume Workshop, with Hunter Jackson, 2009
86. Paleolithic Skills & Survival Workshop series, with Mike Metzger, 2009
87. Programming the iPhone 101, with Chandler McWilliams, 2009
88. Basic Soldering: Mignonette Game Kit, with Rolf Widenfelt, 2009

89. Echo Park Medicinal Forage, with Nance Klehm, 2009
90. Introduction to Motors and Mechanisms, with Michael Kontopoulos, 2010
91. Musical Soldering Workshop, with Mark Allen, 2010
92. Introduction to Bookbinding, with Kristen St. John, 2010
93. Ableton Live, with Steve Nalepa, 2010
94. Solderingwith Brian Crabtree & Kelli Cain, 2010
95. Machine Sewing 101, with Annie O'Malley, 2010
96. Intro to MIG Welding, with Matt Jones, 2010
97. Intermediate Sewing 102: Pattern-making and Alterations, with Annie O'Malley, 2010
98. Intro to Electronics, with Carlyn Maw, 2010
99. Intro to MIG Welding, with Matt Jones, 2010
100. Intro to Arduino, with Carlyn Maw, 2010
101. Sensors and Pattern Recognition, with Heather-Marie Knight, 2010
102. Paleolithic Bone Tools Workshop, with Mike Metzger, 2010
103. Intro to MIG Welding, with Matt Jones, 2010
104. Paleolithic Net-making Workshop, with Mike Metzger, 2010
105. Intro to MIG Welding, with Matt Jones, 2010
106. Sound Synthesis Workshop, with Christopher Mckinlay, 2010
107. Intermediate Welding for Aesthetes, with Christopher McCormick, 2010
108. Automatic Speech Recognition Class, with Joseph Tepperman, 2010
109. My Open Arduino EEG Class, with Aaron Bocanegra, 2010
110. Field Recording Workshop, with Clay Chaplin, 2010
111. The Alphametaphorm & the Typescape: Typographic Workshop, with Djego Padilla, 2010
112. Visual Effects Workshop: Green Screen for Beginners, with Chad Goei, 2010
113. Intro to Processing, with Chandler McWilliams, 2010
114. Information Design: Transforming data into information, information into knowledge, and knowledge into stories, with Djego Padilla, 2010
115. Amplified Party + Contact Microphone Workshop, with Casey Anderson and John P. Hastings, 2010
116. Amateur Bicycle Mechanics: Parent and Child Edition, + Intro to Junkyard Salvaging, with Mister Jalopy, Jesse and Randy, 2010
117. Pinhole Camera Workshop, with j.frede, 2010
118. Knot-Tying Workshop, with Tim Phillips, 2010
119. Introduction to Welding, with Matt Jones, 2010
120. Introduction to Millinery: Fascinator Class, with Corina Haywood, 2010
121. Introduction to Crochet: Make your own Jellyfish, with Cheryl Cambras, 2010
122. Proto-Chiptunes: A DIY digital synthesis Workshop, with Phil Stearns, 2010
123. Multimedia Effects in the Haunted Mansion, with Chris Weisbart, 2010
124. Introduction to Millinery: Fascinators, with Corina Haywood, 2010
125. Introduction to MIG Welding, with Matt Jones, 2010
126. Introduction to MIG Welding, with Matt Jones, 2010
127. The Transparent Substrate: Paper-making with Beets, with Julia Goodman and Scott Cazan, 2010
128. Introduction to Millinery: Felt Hats, with Corina Haywood, 2010
129. David Tudor's Rainforest IV: A sound installation workshop, with Casey Anderson, 2010
130. Typography Workshop: Potato-Type Ransom Notes, with Micah Hahn, Spencer Cross and Cinema Speakeasy, 2010
131. Build and Play a Portable "Electric Eel" Synthesizer, with Noah Vawter, 2010
132. Make Your Own Ginger Ale and Root Beer, with Joel Fox, 2010
133. The Good Kids' Guide to Being a Bit Bad: Cars Edition, with Tom Jennings and Jason Torchinsky, 2011
134. Crocheted Balls + Fingerless Gloves, with Cheryl Cambras, 2011
135. Intro to Millinery: Fascinators, with Corina Haywood, 2011
136. Intro to MIG Welding, with Matt Jones, 2011
137. Online Sci Fi Writing Course, with Mark von Schlegell, 2011
138. Basic Electronics for Artists, with Casey Anderson, 2011
139. Intro to MIG Welding, with Matt Jones, 2011
140. Basic Electronics for Artists, with Casey Anderson, 2011
141. Intro to Processing, with Chandler McWilliams, 2011
142. Machine Sewing 101, with Annie O'Malley, 2011
143. Intro to Arduino, with Elisabeth McMullin, 2011
144. Intro to MIG Welding, with Matt Jones, 2011
145. Musical Soldering Workshop, with Chris Kallmyer and Scott Cazan, 2011
146. Programming the iPhone 101, with Chandler McWilliams, 2011
147. Intro to Millinery: Felt Hats, with Corina Haywood, 2011
148. Intro to MIG Welding, with Matt Jones, 2011

149. POST-BOOK: Bound sequences unbound. A workshop in designing for print,with Djego Padilla, 2011
150. Information Design: Visualizing Data, with Djego Padilla, 2011
151. Intro to Max/MSP, with Elisabeth McMullin and Casey Anderson, 2011
152. Intro to MIG Welding, with Matt Jones, 2011
153. Sound Recording/Engineering Class, with Christopher McKinlay and Jonathan Snipes, 2011
154. Sounds Around the Home, with Rick Potts, 2011
155. Intro to MIG Welding, with Matt Jones, 2011
156. Sound Synthesis Class, with Christopher McKinlay, 2011
157. Intro to MIG Welding, with Matt Jones, 2011
158. Intro to MIG Welding, with Matt Jones, 2011
159. Intro to MIG Welding, with Matt Jones, 2011
160. Exploration of Millinery, with Corina Haywood, 2011
161. Introduction to Microcontrollers with Arduino, with Elisabeth McMullin, 2011
162. Intro to Oxyacetylene Torch Welding, with Matt Jones, 2011
163. Intro to MIG Welding, with Matt Jones, 2011
164. Intro to MIG Welding, with Matt Jones, 2011
165. Exploration of Millinery: Sculptural Straw Hats Class, with Corina Haywood, 2011
166. Intro to Millinery: Felt Hats, with Corina Haywood, 2011
167. Intro to Oxyacetylene Torch Welding Class, with Matt Jones, 2011
168. Intro to MIG Welding, with Matt Jones, 2011
169. Drawing and Drones, with Gail Swanlund & Brian Saia, 2011
170. Exploration of Millinery: Unconventional Materials, with Corina Haywood, 2011
171. Intro to MIG Welding, with Matt Jones, 2011
172. Introduction to Bookbinding, with Kristin St. John, 2011
173. Intro to MIG Welding, with Matt Jones, 2011
174. Drawing Plants, Not The Usual Approach, with Mercedes Teixido, 2011
175. P.I.E. (Personal Immersive Environments), with Amy Jo Diaz and Casey Hughes, 2012
176. Intro to Microcontrollers with Arduino, with Elisabeth McMullin, 2012
177. Sound Synthesis Class, with Christopher Mckinlay, 2012
178. Intro to Electronics, with Elisabeth McMullin, 2012
179. Special Theatrical Effects Workshop, with Chris Weisbart, 2012

180. Mask-Making Workshop, with Joe Seely, 2012
181. Motors and Mechanisms, with Michael Kontopoulos, 2012
182. Staple Draping Workshop, with Laura Brody, 2012
183. Noise Object Workshop and Group Sound Experiment, with Brian Crabtree & Sara Roberts, 2012
184. Public Labs Map Making Workshop, with Stewart Long, 2012
185. Bodies, Sensors and Sound, with Natalie Metzger and Stephanie Smith, 2012
186. Ghosts!, with Chris Weisbart, 2012
187. Third Eye Workshop, with Tim Perkis and Sara Roberts, 2012
188. Mask-Making Workshop, with Joe Seely, 2012
189. Intro to Arduino, with Scott Cazan, 2012
190. FLOWERS DREAMING THE ELEVATION ALLEGIANCE: A (Soma)tic Poetry Workshop, with CAConrad, 2012
191. Bulgarian Singing Workshop, with Kate Conklin, 2012
192. Drawing & Drones 2, with Melissa Manfull & Sublamp, 2012
193. Experiments in Hydraulics and Pneumatics, with Nick Rodrigues, 2012
194. Gastrochromatography, with Chelsea Martinez, 2013
195. Field Recording Workshop, with Clay Chaplin, 2013
196. Mind Reading Workshop, with Krystal Krunch, 2013
197. Musical Soldering Workshop, with Mark Allen, 2013
198. Lie Detector Workshop, with Chris Kallmyer, 2013
199. DIY Tonic & Bitters Class, with John Park, 2013
200. Embroidery for Artists, with Jenny Hart, 2013
201. Bulgarian Folk Singing, with Kate Conklin, 2013
202. Glitch Art Workshop, with Phillip Stearns, 2013
203. Pantomime Workshop, with Kate Conklin and Benedikt Negro, 2013
204. Yodels of the World, with Kate Conklin, 2013
205. Guitar Pedal Workshop, with Paul Rothman, 2013
206. Architectural Drafting for Hackers, Makers and Visionary Dilettantes, with Anne Hars, 2013
207. Intro to Arduino, with Scott Cazan, 2013
208. Light-Sensitive Oscillators: Learn to Make Sound Circuits, with Raphael Arrar, 2013
209. Seeing and Hearing Patterns in Sound Workshop, with Laura Steenberge, 2013
210. Electric Bodies Workshop, with Casey Anderson, 2013

211. 3d Video Mapping Workshop, with Refik Anadol, 2013
212. Programming the iPhone 101, with Chandler McWilliams, 2013
213. Embroidering Neutra VDL Workshop, with Jenny Hart, 2013
214. Cigar Box Spring/Slinky Reverb Unit Workshop, with Josh Gerowitz, 2013
215. Beginning Raspberry Pi Workshop: Make an HD Video Player, with Clay Chaplin, 2013
216. Indian Classical Tabla and Vocal Workshop, with Robin and Rajen Sukhadia, 2013
217. Experimental Casting Workshopwith Mary Hill, 2013
218. Musical Soldering at 1450 Oceanwith Mark Allen, 2013
219. Embroidery for Artists at 1450 Oceanwith Jenny Hart, 2013
220. Automatic Embroidery and Ghostly Encounters, with Jenny Hart, 2013
221. Introduction to Processing: Programming Fundamentals, with Raphael Arar, 2013
222. Advanced Processing: Programming Generative Art, with Raphael Arar, 2013
223. DIY Bitters Making & Tasting Workshop, with John Park, 2014
224. Improv for People Who Would Never Take an Improv Class, with Ben Benjamin, 2014
225. Digital Cameras + Circuit Bending = Glitch Art, with Phillip Stearns, 2014
226. Experimental Casting Workshop at Center for the Arts Eagle Rock, with Mary Hill, 2014
227. Bread Baking Using Naturally Leavened Dough and Whole Grain Flour, with Michael O'Malley, 2014
228. Becoming Anonymous, with Professors X and Y, 2014
229. Raspberry Pi Camera Module Workshop — Time Lapse Video, with Clay Chaplin, 2014
230. Intro to Textile Design & Sewing, with Gail Swanlund, 2014
231. Intro to Arduino, with Scott Cazan, 2014
232. Make Your Own Algae Sculpture, with Denise King, 2014
233. Circuit Drawing 101, with Gottfried Haider, 2014
234. Holiday Re-Gifting with DIY Vacuum Forming, with Nick Rodrigues, 2014
235. Intermediate Arduino: Automated Household Electronics, with Dave Casey, 2014
236. Amateur Hour with the Best Friends Learning Gang: HYPNOSIS, with Danielle Bustillo and Joey Canizarro, 2014
237. Know Thy Enemy!, with Ken Ehrlich and Janet Sarbanes, 2014

238. Multimedia Effects in the Haunted Mansion workshop, with Chris Weisbart, 2014
239. Guitar Pedal Building Workshop, with Mike Wait, 2014
240. Embroidering in Architecture Workshop, with Jenny Hart, 2014
241. Soap Making Workshop, with Lisa Anne Auerbach, 2014
242. The Urban Cat Architecture Workshop, with Keith Rocka Knittel, 2014
243. The Gamble Birdhouse Workshop, with Scout Regalia, 2014
244. Afternoon Tea with the Women of the Gamble House, with the Women's Center for Creative Work, 2014
245. Letter Writing Workshop, with Mercedes Teixido, 2014
246. Paper Cutting Workshop, with Kaitlynn Redell, 2014
247. Plant Preservation and Natural Perfumery Workshop, with instructor Divya Anantharaman, 2014
248. Solar Sun Chime Workshop, with David Casey, 2014
249. Scraping, Munging and Mining, with Anthony Arroyo, 2014
250. Beginning Raspberry Pi – Getting Started with Video and A
251. dio, with Clay Chaplin, 2014
252. Wild Clay Workshop, with Ako Castuera, 2014
253. Data Art Workshop, with Anthony Arroyo, 2014
254. PhoneGap 101: Utilizing Web Technologies for Mobile Apps,
255. with Raphael Arar, 2014
256. Palm-Reading and Life-Casting Workshop, with Mary Hill and Zac Monday, 2014
257. Web Fundamentals for Mobile Design Workshop, with Raphael Arar, 2014
258. Neanderthalism: Handmade Art Materials from your Backyard Workshop, with Katie Herzog, 2014
259. Workshop on Workshops NYC, 2014
260. Episodes in the Life of Bounce, with Carlin Wing, 2015
261. Blisters, Boils, and Open Wounds – FX Makeup Workshop, with Camella D. Kim, 2015
262. The Rational Dress Society Presents: Make Your Own JUMPSUIT, with The Rational Dress Society, 2015
263. Claire Titelman Workshop of Filthy, with Claire Titelman, 2015
264. I'd Rather Listen to a Bad Song, with Adam Goldman, 2015
265. THE NEVER BEEN TO ME TOUR AT COLGATE UNIVERSITY, with Krystal Krunch, 2015
266. Death Metal Vocals Workshop: Guttural Screams and Piercing Shrieks,

with Lilia Bogoeva, 2015

267. Graceless Lady: Mystery Theater Dance Workshop, with Maria Garcia and Clare Kelly, 2015
268. Data Smuggler's 101: PGP Email Encryption, with Professor Y and the Crypto-trailer, 2015
269. Amateur Hour: Becoming Famous – Facial Contouring, Head Shots, Bios and More..., with The Best Friends Learning Gang, 2015
270. Workshop on Workshops, 2015
271. Bondage Hoods, Bagels, and Bloody Marys, with Kim Ye and the students of Mark Allen's Curatorial Class, 2015
272. Private Virtual Realities Workshop, with Kyttenjanae and Thom Rugo, 2015
273. DIY Art Space or Whatever, Mark Allen, 2015
274. LED Bicycle Wheel Animation Workshop, with Alex Bielawiec and Charles Dandino, 2015
275. Train the Trainer: Wikipedia Editing Workshop, Art +Feminism, 2015
276. DIY Miso Workshop, with Bob Dornberger of Secret Restaurant, 2015
277. Past Life Regression and 3D Modeling Workshop, with Krystal Krunch and Chris Weisbart, 2015
278. Dear God, Why? The Catholic Dead on Display, with Elizabeth Harper, 2015
279. Tarot Deck Making and Reading Workshop, with Amy Von Harrington and Marty Windahl, 2015
280. Felting and Natural Dyeing Workshop, with Carolyn Mason, 2015
281. Urban Cat Architecture, with Keith Rocka Knittel, 2015
282. LitTech: Tools and Creative Writing Workshop, with Joshua Wolf Shenk, 2015
283. Projection Mapping Workshop, with Kate Parsons and Gareth Walsh, 2015
284. Voice/Text-Sound/Improvisation Workshop, with Jaap Blonk, 2016
285. Investigative Practices 101, with Anne Elizabeth Moore, 2016
286. Lock Picking and Handcuff Escape Workshop, with John Park, 2016
287. Motion Sensing Scent Dispenser and Scent Design with IAO, with Chris Weisbart and Saskia Wilson-Brown, 2016
288. GOOGLE WILL EAT ITSELF and the EKMRZ Trilogy, with UBERMORGEN, 2016
289. Be the Cult Leader You Wish to Follow: A Workshop for Artists, with Kim Ye, 2016
290. Shallow Listening Practice, with Chris Kallmyer, 2016

291. How to be a Choir, Chris Kallmyer, 2016
292. Sci-Fi Cyanotype, with Machine Project and Edendale Branch Library, 2017
293. Sousveillance & Raspberry Pi, with Casey Anderson, 2017
294. Grist & Toll Flour Workshop, with Nan Kohler from Grist & Toll Flour Mill, 2017
295. Corsican Folk Singing Workshop, with Linnea Sablosky, 2017
296. Bits & Bytes, with Christine Meinders, 2017
297. Drawings and Drones, with Melissa Manfull, 2017
298. Pocket Sewing 101, with Michaela Hansen, 2017