

FOREWORD

TODAY, A RADICAL RESURGENCE IN MAKING IS UNDERWAY, CHANGING ART, EDUCATION, INDUSTRY, AND WHAT IT MEANS TO CREATE.

For many, tinkering is something that a previous generation used to do. Yet it is possible that tinkering is something that many of us do without knowing it has a name—even those who do it may not realize that they do it well. What is the current value of tinkering and what is its place in our lives and culture?

Tinkering is the essential art of composing and decomposing physical things to suit a variety of purposes—from practical to whimsical. Tinkering is both a manual and mental labor, perhaps even a labor of love. By the process of tinkering, we learn how to change and shape the world in small but significant ways and adapt it to our personal needs. In spirit, it is close to hacking, a more recent term applied to modifying software and computers. While tinkering can use traditional techniques and materials, today it integrates digital technologies as well.

The Art of Tinkering is both an invitation for everyone to tinker and an appreciation of creative artists who introduce us to many different forms of tinkering. This book captures and shares with a new audience the work of Karen Wilkinson and Mike Petrich at the Exploratorium's Tinkering Studio. They are recognized leaders in developing the practices of tinkering as a form of public engagement, organizing meaningful hands-on activities for young and old as well as curating the work of artists and makers that encourage us to see tinkering in a new light.

I have enjoyed collaborating with Karen and Mike over the years since I started *Make Magazine* and Maker Faire. We share a common mission: We want people to see themselves as makers and producers, defined more by acts of creation than consumption. We also share an expanding roster of talented individuals whose projects delight us and who inspire us all to become makers—many of the artists in this book have been at both the Exploratorium and Maker Faire. Making is something that anyone can do, but we should understand it as something we *need* to do. As the poet Frank Bidart wrote: “we are creatures who need to make.” It is how we learn who we are.

The growth of the Maker movement is a sign that people are discovering and rediscovering their own capacity to tinker and make. They find it enjoyable and meaningful, both personally and socially. And as our lives are increasingly dominated by screens and virtual interactions, *The Art of Tinkering* reminds us to keep exploring the creative potential of our physical interactions with real things and real people. It is how we reveal who we are.



Dale Dougherty
Editor & Publisher
of *Make Magazine*

Al Bellevue's *Tool Box*, a clever assemblage
of tools made for carrying other tools. ▶





INTRODUCTION

THE PURE, FOCUSED BLISS OF TINKERING ISN'T JUST FOR ARTISTS OR ENGINEERS. IT'S A WAY THAT WE CAN ALL BE MORE HUMAN.

One of my fondest childhood memories is of my dad bringing home an old typewriter from the dump as a gift. My brother and I quickly set upon it with screwdrivers and wrenches—what a beautiful thing it was! Full of brass gears and delicate, ornery springs, with lovely round black keys for letters. We spent countless hours transforming its pieces into jewelry, small vehicles, doll furniture, and sculptures.

For me, the memory of that magical and absorbing typewriter exemplifies the compulsive, human heart of tinkering. People revel in taking things apart, putting them back together, and making new things. We work joyfully and obsessively to build utterly personal creations—like giant marble slides, ingenious and witty automata, colorful rag quilts, and cardboard puppets. Because when you make these things, you articulate aspects of being human that cannot be communicated any other way.

I am incredibly fortunate to have a career in tinkering. As a professor and the director of the High-Low Tech group at the MIT Media Lab, and now as an independent designer, I get to build lots of things myself. But by designing toolkits and holding workshops, I'm also able to share this joy with others: the pleasure of working with both your body and your mind, the satisfaction of feeling frustrated and then triumphant when confronted with a challenge, and the sense of freedom and opportunity that comes from making something entirely your own.

The Exploratorium's Tinkering Studio has been an inspiration since I discovered it almost 10 years ago. I had the privilege of spending a month there as a visiting artist, which shaped me as a young teacher and builder in countless ways. Most memorably, it taught me the importance of two crucial practices that are easy to overlook: retaining a sense of play in what you do and leaving room for quiet and (sometimes slow) reflection in the making process.

It is a wonderful treat to have much of the magic of the Tinkering Studio—and the magic of tinkering itself—captured in this book. It's a beautiful volume full of enchanting constructions, each one stranger and more marvelous than the last. Yet what makes it truly extraordinary is that it pays as much attention to the process of making as it does to the final products themselves. All great tinkerers are great copiers, and there's a treasure trove of secrets—about materials, techniques, and perspectives—to absorb in *The Art of Tinkering*. After reading it, I'm overflowing with ideas for new projects and I'm sure you will be, too.

Leah Buechley
Designer, Artist
& Engineer

◀ Leah's *Living Wall*, an interactive wallpaper designed to light up and play birdsong in response to your touch.



A FEW WORDS FROM KAREN & MIKE

For us, tinkering started when we were kids—when we were encouraged to explore our environments, ask questions, and construct our own understandings of the world. We were given permission to get messy, find out for ourselves, and try out crazy ideas just for the sake of experience—and allowed to get lost in the woods and in our own imaginations.

These moments sparked a lifetime of learning through making, putting us on a trajectory that included experimenting with various media at art school and incorporating electronics into creative expression at the MIT Media Lab. Ultimately, these moments led us to the Exploratorium, where we foster similarly crucial, formative, and fun moments for our visitors. As codirectors of the museum's Tinkering Studio, we work with a group of talented, inquisitive individuals to design workshops that combine science, art, and technology in playful and inventive ways—inviting visitors to pick up a hand tool, futz around with loose parts, and make a mess while creating their own whimsical, original projects.

But what is *tinkering*? The word was first used in the 1300s to describe tinsmiths who would travel around mending various household gadgets. But in our minds, it's more of a perspective than a vocation. It's fooling around directly with phenomena, tools, and materials. It's thinking with your hands and learning through doing. It's slowing down and getting curious about the mechanics and mysteries of the everyday stuff around you. It's whimsical, enjoyable, fraught with dead ends, frustrating, and ultimately about inquiry. It's also about making something, but for us, that thing reveals itself to you as you go. Because when you tinker, you're not following a step-by-

step set of directions that leads to a tidy end result. Instead, you're questioning your assumptions about the way something works, and you're investigating it on your own terms. You're giving yourself permission to fiddle with this and dabble with that. And chances are, you're also blowing your own mind.

The Art of Tinkering is our invitation to you to join in on this invaluable and enriching way of going through the world. In this book's pages, we've profiled beloved artists who have spent time at the Tinkering Studio and who embody what we call the tinkering disposition. For each artist, there are details of their processes—their favorite tools, materials, inspirations, and prototypes—and the stories of how they stumbled upon a method that works for them. Then we talk about other makers working in a similar vein to show you all the possibilities that a certain technique can yield.

Finally, there are ways that you can tinker, too: ideas to get you started on your very own explorations. Because we want you to get your hands dirty. We want you to engage, get stuck, and play with a problem until you come around to a deeper understanding. We find that the combination of confidence and competence that results from tinkering is irresistible—and if we make it part of our everyday lives, we'll all be richer for it.

Karen Wilkinson & Mike Petrich
Codirectors of the Tinkering Studio