GEJ Global Environmental Justice Documentaries

TEACHER'S GUIDE



# Death by Design

## The Dirty Secret of Our Global Addiction

2016 • 73 minutes • Directed by Sue Williams • Distributed by Bullfrog Films

Consumers love—and live on—their smartphones, tablets, and laptops. A cascade of electronic devices pours endlessly into the market, promising better communication, non-stop entertainment, and instant information. The numbers are staggering. By 2020, as many as four billion people will have personal computers. Five billion will own a mobile phone.

But this revolution has a dark side that's hidden from most consumers. *Death by Design* investigates the electronics industry and reveals how even the smallest devices have deadly environmental and health costs.

From the intensely secretive factories in China to a ravaged New York community to the high-tech corridors of Silicon Valley, *Death by Design* describes a fast-approaching tipping point between consumerism and sustainability and asks: What can we do?

**CURATOR:**

**Rajashree Ghosh**
*Resident Scholar, Women's Studies Research Center, Brandeis University*

## WHY I SELECTED THIS FILM

*Death by Design* examines the global environmental and public health consequences of an all-consuming digital revolution. Smartphones, laptops, tablets, and devices of all kinds have flooded the market, promising high-tech communication capacities and instant information. In this riveting documentary, Sue Williams delves deep as she describes how the manufacturing and disposal of digital devices have deadly consequences.

From China, where most devices are manufactured, to ravaged communities in New York and California, once centers of high-tech manufacturing, the film explores underreported stories of environmental degradation and health tragedies linked to the industry.

What emerges is the dark side of a global industry and a tipping point between consumerism and sustainability. Illustrating some of the lessons learned in the field of environmental justice, the film also advocates a sustainable future for humans and other living beings and the sustainable exploitation of natural resources.

*What emerges is the dark side of a global industry and a tipping point between consumerism and sustainability.*

## SUGGESTED SUBJECT AREAS

American Studies
Asian Studies
Business
Clinical Health and Psychology
Communication and Media
Computer Science
Economics
Engineering
Environmental Science
Finance
Geography
Globalization
Labor Economics
Law
Life Sciences
Occupational Health and Safety
Politics
Sustainability
Technology
Toxic Waste

## SYNOPSIS

**Toxic waste, toxic work**

The film opens with examples of terrible water pollution produced by Chinese manufacturing plants that produce iPhones and laptops, many of them for North American markets. With the help of footage filmed by workers using hidden cameras, Williams examines the oppressive working conditions and the severe health risks some of the workers face. The film also exposes similar problems in Silicon Valley and New York during the technology boom in the 1980s and 1990s, where exposure to lead and other toxic waste damaged the health of both children and adults.


As the production of personal electronics that are "designed to die" increased and supply chains moved offshore, the human and environmental costs of producing these electronics and disposing of the resulting waste shifted from the U.S. to other countries, especially China. As an environmental geographer notes, in North America, "We have very little relationship to our garbage here. We throw it away, and my point is to say, where is *away*? Away is here, for someone." Guiyu, a manufacturing center on the Maozhou River northeast of Hong Kong, became the new away and the focal point for e-waste dumping.

**What can be done?**

The film also includes examples of activists who are working with factories to reduce pollution. Others are suing polluters and their parent companies, hacking devices to make them last longer, and reinventing computers using non-toxic materials. The film concludes with a call for consumers to raise their voices and use their wallets to demand greater safety for workers and protection of the environment.

> Death by Design *makes the invisible visible and pushes us to consider the extent and nature of the ecological degradation and impact on human health caused by our digital lifestyle*
>
> **—Dr. Jonathan Beever, Assistant Professor of Ethics and Digital Culture; University of Central Florida**

## THE ENVIRONMENTAL JUSTICE FOCUS

*Death by Design* investigates the unfettered consumption of the latest devices, such as laptops, mobile phones, and tablets, and their impact on the environment and human health. Western brands such as Apple, IBM, and Samsung, using suppliers based in China, have ushered in a digital revolution. But thanks to poor enforcement of environmental regulations, the production and recycling of these products have contributed greatly to the pollution of rivers and groundwater. In China, 60% of the water has been rendered unfit for human consumption.

In addition, as the film shows, the electronics industry frequently forced workers to labor in unhealthy and abusive work environments where they earn low wages producing expensive goods for a global market. Poor protection from toxic chemicals, including cadmium and lead, left workers at risk from cancers, skin diseases, stress, mental illness, and even suicide. In the U.S. as well, communities adjacent to high-tech producers have been harmed by exposure to toxic chemicals.

But could this change? *Death by Design* suggests several ways to design, fix, and lengthen the life span of devices to reduce their impact on the environment and human health. As consumers, the film concludes, we can make a conscious decision to challenge and reprioritize our lifestyles to ensure that future generations can live in a more just and environmentally sustainable world.

> *Powerful… A useful film for environmental science and business classes where students are studying companies' global impact.*
>
> **—Gen Diorio, School Library Journal**

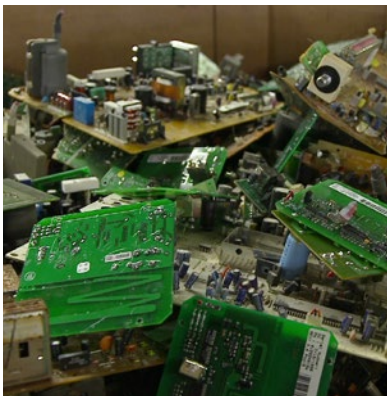
## REVIEWS

"*Death by Design* makes the invisible visible and pushes us to consider the extent and nature of the ecological degradation and impact on human health caused by our digital lifestyle. Through powerful narrative and images, the film presents this challenge to students and community members. This is an excellent resource to stimulate discussion and motivate action related to the heavy ethical and environmental burdens of the digital age."

—**Dr. Jonathan Beever**, Assistant Professor of Ethics and Digital Culture; Director, Theoretical and Applied Ethics Certificate Program, University of Central Florida

"It's important to make ourselves face the dirty and dangerous life cycles of these gadgets and make responsible choices when we purchase and dispose of them. This film offers a comprehensive view of the problems as well as points to solutions."

—**Cherice Bock**, *Whole Terrain* journal



"You won't look at your iPhone in quite the same way again after viewing Sue Williams' thoughtful documentary."

—**Moira Macdonald**, *The Seattle Times*

"Both jaw-dropping and heartbreaking, *Death by Design* forces the viewer to reconsider the whole approach to technology and this mad and unsustainable obsession with constantly upgrading."

—**Hannah Clugston**, *Aesthetica* magazine

"An extraordinary film. I have studied the problem of environmental hazards in the global electronics industry for 20 years, and this is the best documentary I have seen on the subject matter. This film explains the sources of the environmental threats in the industry, demonstrates how local struggles are linked to global-scale phenomena, and chronicles how community leaders around the world are taking positive steps to address these challenges. I will use this film in my courses for years to come."

—**David Naguib Pellow**, Professor of Environmental Studies, UC Santa Barbara; co-author, *Challenging the Chip: Labor Rights and Environmental Justice in the Global Electronics Industry*


## KEY LOCATIONS

Wuhan, China
Shenzhen, China
Maozhou River
Chengdu, China
Guiyu, China
Silicon Valley, California
San Jose, California
San Diego, California
Endicott, New York
San Luis Obispo, California
Dublin, Ireland
Hanover, Germany




## PEOPLE FEATURED

**Ma Jun** – director, Institute of Public and Environmental Affairs, China

**Ted Smith** – founder and former director, Silicon Valley Toxics Coalition

**Art Rodriguez** – former employee of IBM

**Mike Gray** – former buyer for IBM

**Yvette Flores** – former employee of Spectra-Physics

**Amanda Hawes** – lawyer

**Richard Clapp** – epidemiologist

**Ann Blake** – environmental consultant

**Linda Greer** – senior scientist, health program, Natural Resources Defense Council

**Scott Nova** – executive director, Worker Rights Consortium

**Li Qiang** – executive director, China Labor Watch

**Garrett Brown** – occupational health and safety expert

**Tian Yu** – injured worker, formerly at Foxconn

**Tian Jiandang** – Tian Yu's father

**Kyle Wiens** and **Luke Soules** – co-founders of iFixit

**Larry** and **Toni Sherling** – homeowners in Endicott, New York

**Anne Galligan** – co-founder IAMECO, Dublin, Ireland

**Darrin Magee** – associate professor, environmental studies, Hobart and William Smith

**Dr. Xia Huo** – pediatrician, Guangdong, China

**Don Cass** – general manager, 2trg Recycling

**Kimberly Prather** – professor, atmospheric chemistry, UC San Diego

*The IT industry has put immense pressure on the environment and on public health.*

## FILM SEQUENCES

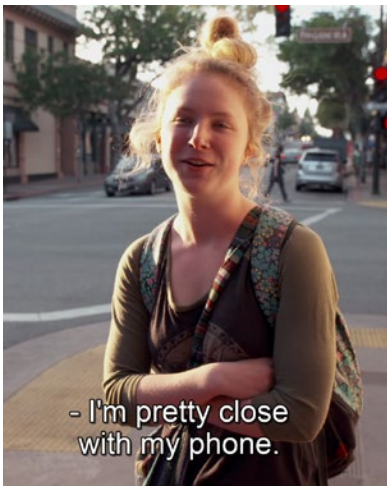
Recommended excerpts are highlighted. See page 11.

### Excerpts – clip 1 of 4:

**Introduction: In a beautiful cloud** 0:00–1:11

On the street, people are asked which devices they use and can't do without. Titles. Director Sue Williams says she too is attached to her sleek and elegant phone, computer, and tablet.

In the past two decades, these devices have changed the way people communicate and live. "We store our lives in a beautiful cloud," Williams says.




**Designed to die** 1:12–2:29

The secrets of the industry emerge: Devices that are "designed to die" can damage human lives as well as the environment.

**IT, and the Wuhan and Yangtze rivers** 2:30–3:39

Ma Jun documents pollution in China's Yangtze River in 2011; an electronics factory releases toxic chemicals into a lake. The IT industry there has put immense pressure on the environment and on public health. There are 300 million rural residents without access to safe drinking water, and more than 60% of China's groundwater is unfit for consumption.

**See it to believe it** 3:40–4:13

A man rows on a filthy river.

**Old ladies ask for help** 4:14–5:10

Ma Jun recalls meeting old women on their knees, pleading for help. Even though as a member of an NGO he lacks administrative power, he decides to bring their message out in the open to investigate the effects of the IT industry.


**Silicon Valley** 5:11–6:30

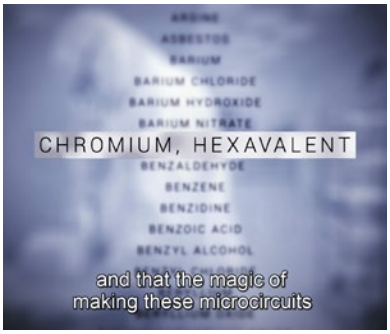
Ted Smith arrived in 1969 to study law; he describes the rapid growth surge of the electronics industry in Silicon Valley, which includes Hewlett-Packard, Apple, Intel, and IBM.

**Working for IBM** 6:31–7:35

Art Rodriguez describes IBM's clout. Mike Gray was the first microprocessor buyer for IBM. In the 1980s, the sale of personal computers took off as 50,000 units were shipped in the first year.

**As clean as a hospital...?** 7:36–8:52

The semiconductor industry should really be seen as a chemical-handling industry, Smith argues, as it employs toxic materials that include asbestos, barium, benzene, chromium, copper cyanide, and hexavalent. Rodriguez recalls using sulfuric acid to clean disks. Smith could see that people were getting sick from exposure to chemicals on the job.




**"Green gunk"** 8:55–12:47

After Yvette Flores was exposed to lead oxide, or "green gunk," her son Mark was born with developmental disabilities. Since then, he has been completely dependent on her for his care. A lawsuit has been filed against her employer. Lawyer Amanda Hawes talks about "systemic concealment of chemical poisoning." Her team filed lawsuits on behalf of IBM workers and families.

The corporate mortality file includes 33,000 deaths. Richard Clapp says the impact includes a fourfold increase in breast cancer, along with non-Hodgkin's lymphoma, brain cancer, and skin cancers.


**IBM faces 200 lawsuits** 12:49–15:05

Jim Moore and Alida Hernandez's case: IBM blocked the mortality analysis from being presented in court. Linda Greer talks about brands and companies refusing to accept that chemical exposure in their facilities caused disastrous environmental and occupational health impacts. IBM refuses a request for an interview.

### Excerpts – clip 2 of 4:

**"Lucky supermarket on unlucky site"** 15:06–18:10

Smith describes contaminated sites and the arrogance of a company representative, who told him, "You should be lucky that we're here." Toxic chemicals stored in underground tanks leak and enter the groundwater, affecting hundreds of families, who experience higher rates of miscarriages and birth defects.

*Many neighborhoods were unaware of toxic chemicals leaching out of soil in sites owned by HP, National Semiconductor, IBM, and Google.*

**Silicon Valley Toxics Coalition** 18:11–20:32

A petition from the Silicon Valley Toxics Coalition calls on the Environmental Protection Agency to exercise its authority. Many neighborhoods were unaware of toxic chemicals leaching out of soil in sites owned by Hewlett-Packard, National Semiconductor, IBM, and Google. The EPA agrees to establish "Superfund" cleanup sites and says it will take 300 years to clean them.



**The new supply chain: made in China** 20:33–23:15

China lures high-tech companies with land and low-cost labor as production ramps up. In the early 1990s, the Apple iPod earned $100 million in sales. The iPhone 5 earned $10 million a week. Scott Nova and Li Qiang describe low wages and pressure on the workers to produce. Workers' pay amounts to just 1% of the total cost of an iPhone.

**Video recording by workers** 23:16–25:37

Backed by footage from hidden cameras, workers for Apple, Hewlett-Packard, and HTC describe bullying, harassment, long hours, and no compensation for injuries.

## Excerpts – clip 3 of 4:

**Foxconn and Apple** 25:25–31:40

Long shifts, isolation, and alienation have resulted in suicides. Tian Yu, aged 17, jumped off the Foxconn factory roof and received no compensation other than some assistance from the company. Government officials monitor Tian Yu's family and what they say to the media. A 2011 explosion at Foxconn in Chengdu left two dead and 16 injured. Another explosion followed at a plant supplying Apple.

**On the street** 31:40–42:57

People are asked how often they upgrade their phones.

Kyle Wiens of iFixit explains how Apple has a built-in battery. Consumers have to buy a new cellphone every 18 months, and manufacturing just one requires 500 pounds of raw material. Products are meant to be disposable. Luke Soules locates a supplier in Shenzhen. The Maozhou River is contaminated by waste from circuit board manufacturers.

**Ma Jun and IPE** 42:57–48:33

Jun receives the Skoll Foundation's award for social entrepreneurship and builds a national air and water pollution database. Jun says fines against polluters have been trivial and ineffective. (They were later increased.) Jun and the Institute of Public and Environmental Affairs, in collaboration with Linda Greer of the U.S.-based Natural Resources Defense Council, begin to trace supply chains and identify polluters, including Apple. One supplier generates 100,000 tons of hazardous waste in a year.

*Every year, three million tons of electronic waste are generated in the US. Of that, only 15% gets recycled.*


**Endicott, New York** 48:44–53:04

Cancer-causing solvents leaked from IBM plants in New York state. Several households in one neighborhood have members who have cancer or died from cancer. Toni Sherling drew a map of 16 homes with 12 cases of cancer in them. In 2015, they received a settlement from IBM.

### Excerpts – clip 4 of 4:

**Reimagining devices** 53:12–58:39

Paul Maher of MicroPro Computers in Dublin, Ireland, designed and built updatable, upgradable, reusable computers without plastic, PVCs, mercury, or lead. The design won awards but few customers.

**Dealing with obsolete devices** 58:40–1:01:53

Every year, three million tons of electronic waste are generated in the U.S. Of that, only 15% gets recycled. Don Cass shows Darrin Magee sorting plastics, wires, and boards. "We have very little relationship to our garbage here," an environmental geographer observes. "We throw it away, and my point is to say, where is away? Away is here, for someone."

**Back to China** 1:02:07–1:08:54

Millions of used devices end up back in China for recycling. (Much of this flow is now directed to other countries. See map at end.) Dr. Huo talks about Guiyu's dismantling of ewaste and its impact on children's health. These chemicals also negatively affect China's precious arable land. Kimberly Prather notes that while we can send waste to China, some of it returns to us as air pollution. Chemical fingerprinting reveals lead in California that originated in Asia. Pollution also affects climate. Aerosol particles in the atmosphere cause too much water in some places and not enough in others, creating tipping points for hurricanes and floods. We are all responsible for our planet.

**Concluding words from Sue Williams** 1:08:55–1:10:02

Our relationship to our devices becomes more complicated once we know the full cost. The electronics industry is moving on to new countries with few laws and poor enforcement of them.

We all share responsibility for this problem, but we can use our voices to demand real labor safety and environmental protection. The digital revolution has improved our lives; we need to make sure it doesn't rob us of our health or our planet.

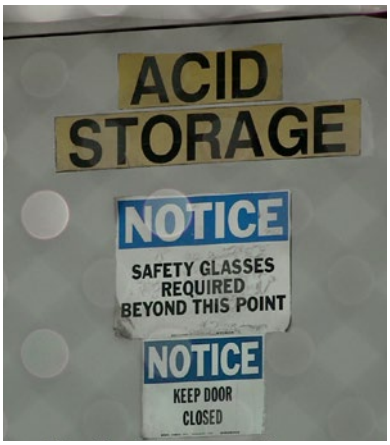
Credits and interviews with people on the street.

*Our relationship to our devices becomes more complicated once we know the full cost.*

## DISCUSSION QUESTIONS

*For the 73-minute version of the film (with relevant clips)*

1. What does Sue Williams mean when she says, "We store our lives in a beautiful cloud?" (0:00–2:29)
2. What comes to mind when viewing the image of the man rowing in a filthy river in China? (3:40–4:13)
   Why didn't people believe him earlier?
3. How has the technology industry taken a toll on ecosystems and the environment in China? (2:30–5:10)
4. In the 1970s and 1980s, the tech industry was booming in the USA and had a reputation as a "clean" industry. Why does Ted Smith call it a "chemical-handling industry"? (5:11–8:52)
5. What was the "green gunk" that Yvette Flores was working with? How did it affect her and her family? (8:55–12:47)
6. What role did the Silicon Valley Toxics Coalition play in bringing attention to groundwater contamination in California communities? (15:06–20:32)
7. Describe some of the working conditions at the Foxconn factory sites in China. (23:15–31:39)
8. Tian Yu is shown in a wheelchair. What is her story? (23:15–31:39)
9. Toni Sherling of Endicott, New York, has a map of her community. What does it show? (48:44–53:04)
10. Can an environmentally beneficial device/product be designed? Discuss. (53:12–58:39)
11. Chemical fingerprinting reveals lead from Asia travels to California. How does that happen? (1:02:07–1:08:54)
12. What can we do as consumers to help reduce the effects of pollution caused by the manufacturing of electronic devices? Discuss.





## EXCERPTS

Where time is short, teachers may choose to assign the following four clips or view them in class. The total running time of the four clips is 38 minutes. The clips can be accessed online via the **Clips** tab on the screening page. The content of each clip is highlighted above in the summary of the film.

**1 of 4: Death by Design** 00:00–12:45, length 12:45

The birth of the semiconductor industry in California gave rise to Silicon Valley and made personal computers and iPhones possible. While the industry was initially considered to be "clean," the mishandling of toxic chemicals during production leads to harm and gives rise to lawsuits. Similar problems emerge in China.

**2 of 4: Lucky supermarket on an unlucky site** 15:06–18:10, length 3:05

The improper storage and disposal of chemical waste result in contaminated soil and water and affect nearby communities in California.

**3 of 4: Foxconn and Apple** 25:25–31:40, length 5:15

Entire cities emerge in China just to build electronic gadgets for the world. Oppressive working conditions documented by workers and activists lead to suicides.

**4 of 4: Toxic work and toxic waste: What choices do we have?**
53:12–1:10:00, length 16:48

Can we reduce, recycle, or reuse consumer electronics?

## QUESTIONS RELATING TO THE EXCERPTS

1. What does filmmaker Sue Williams mean when she says that devices are "designed to die"?
2. Why would people in rural China not have access to safe drinking water?
3. What is the "unlucky site" in Silicon Valley? Discuss.
4. Which chemicals affected the health of residents of Endicott, New York, and Santa Clara, California?
5. What was IBM's "corporate mortality file"?
6. What happens to devices that become obsolete?
7. How can devices be made to last longer and be environmentally friendly at the same time? Give examples from the film.


## ACTIVITIES

How much do you know about recycling electronics? Take the quiz.

**Reduce dependence on single-use plastics.**

One of the lessons learned is that many materials used in manufacturing do not degrade and may produce toxic waste when recycled. Read about alternatives to some common single-use plastics. Be part of the solution. Buy eco-friendly products.

**Don't turn devices into waste: Repair and share them.**

IFixit argues that products that can be repaired should be repaired. Refurbished cellphones can be useful. Repaired computers can help bridge the digital divide. And repairing things creates local jobs. Read the iFixit repair manifesto.

**Who owns the pollution from manufacturing and recycling electronics?**

View the 9-minute video *Lifting the Veil on Polluters in China*, also in the Global Environmental Justice Documentaries Collection.

Are the U.S. and Canada—and many other countries—cleaner because they export their polluting industries to China and Southeast Asia? Should those countries, or companies like Apple, be held accountable for cleaning up China's pollution? If so, how could this be accomplished? How is this an issue of environmental justice?

## SUPPLEMENTAL MATERIAL

Each year, 50 million tons of e-waste are generated. The United Nations warns of a growing e-waste crisis.

How is pollution monitored and regulated in North America? Visit the website of the U.S. Environmental Protection Agency (EPA). Read their definition of environmental justice.

*The digital revolution has improved our lives; we need to make sure it doesn't rob us of our health or our planet.*

Read about Environment and Climate Change Canada.

Do further research on New York state's investigation of chemical spills by IBM in the village of Endicott.

Tour "iPhone City," the massive Chinese factory town where half of the world's iPhones are produced. Read the *New York Times*' in-depth article.

Can energy-efficient appliances make a difference? How? Read about optimizing energy use in the home in this article from Consumer Reports.

Are "eco" labels on products a good guide for consumers? Or are they "greenwashing"? The *New York Times* says many of the claims are inaccurate, or worse.