

# Physical Computing's Greatest Hits (or misses?)



Tom Igoe

ITP

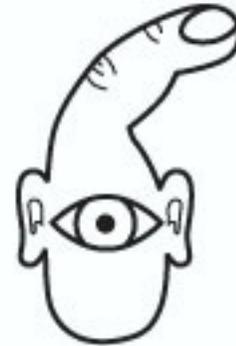
Tisch School of the Arts

NYU

Ed Guttman and Ayad Alkhadi, *flight simulator*

Physical computing is a way of teaching interaction design that foregrounds physical action and how to sense it. The goal is to expand the range of human physical expression that digital systems can sense and respond to.

# How We See the Computer



# How The Computer sees us

It's not about how we see the computer, it's how the computer sees us.

When you're teaching it, there are projects that get repeated all the time. Sometimes the repetitions are great, and sometimes not so great. I think it's useful to re-discover the classics when you're learning, however.

Some of these are due to what the tools afford, some are due to what the teachers have done, and some I can't explain.

# Theremin-like instruments

Greg Shakar, Red Urchin



Musical instruments are great physical interaction projects because you can't be thinking about your actions when you make music, you have to think about the music. The theremin is usually the first instrument people build because it's the simplest to make: photocell on a microcontroller, the results into a synthesizer, and you're done. But the gestures have little meaning.

# Gloves

Jeff Leblanc and Chris Kairalla, *Glove Drum*



The drum glove is second in popularity to the theremin, because it's a musical instrument everyone can understand. Simple to make happen \*and\* a meaningful gesture! Yay!

# Dance Floors

Tali Padan, *Salsa 1001*



become the star of the club with  
the new way to learn salsa!



Salsa



tali padan

1001

Floor pads! Dance Dance revolution! Dancing is one of the most enjoyable forms of physical expression, and the easiest way to sense it is by sensing where you land. and they're wicked simple to make. I love these. The irony is that many geeks do not dance.

# Scooby-Doo paintings

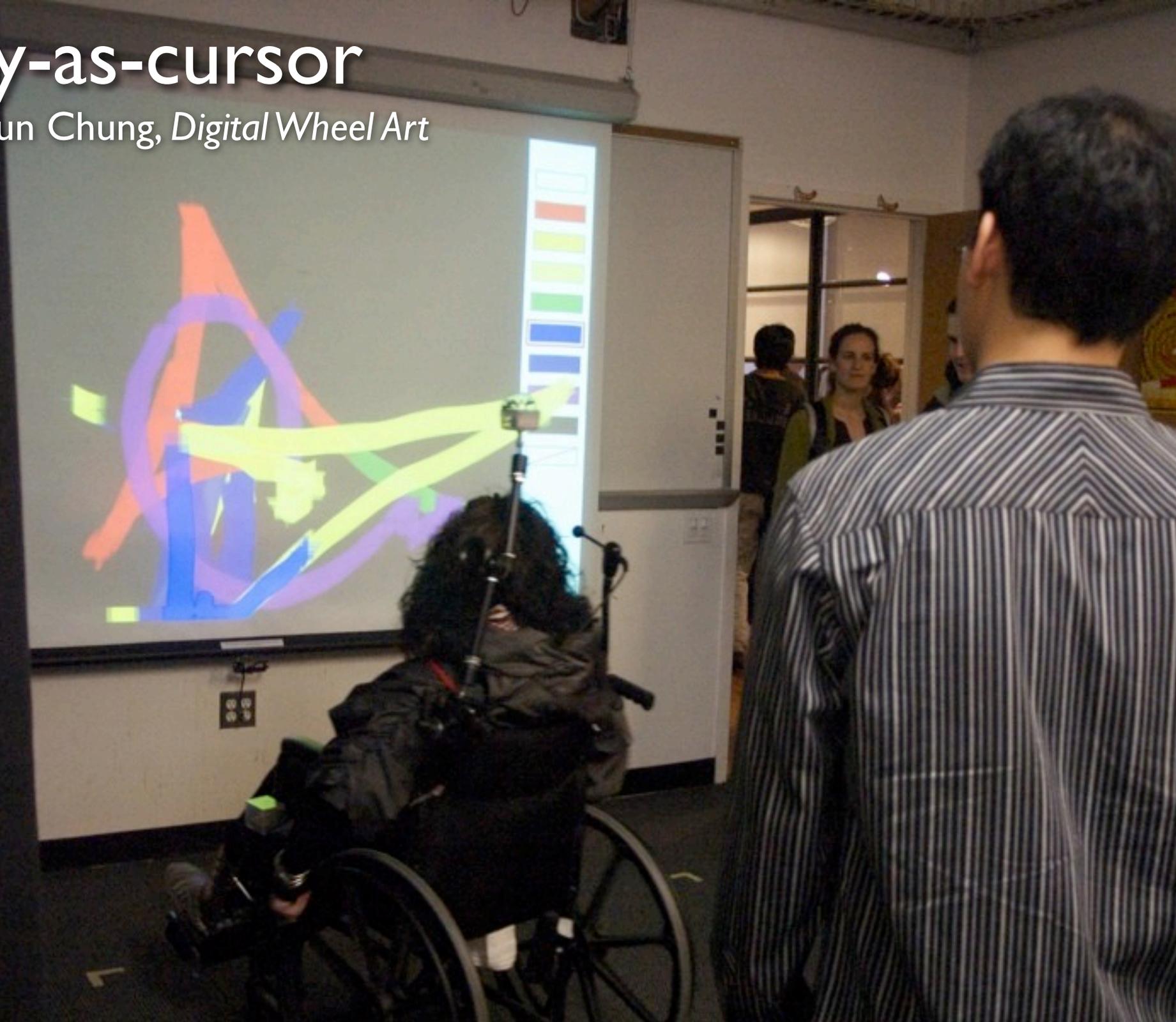
Charles Amis & Ramona Pringle, *Curious Window*



Remember the painting in the Scooby-doo episodes where the eyes followed you? These are a variation on that idea. They're displays that react to your presence, usually through a distance sensor of some sort. The most common mistake made with these is to confuse presence with attention. Smarter versions use cameras instead of distance sensors (now that computer vision is easier) so you can detect face and eyes, and make some guesses about attention.

# Body-as-cursor

Younghyun Chung, *Digital Wheel Art*



The problem with the body as cursor is that it doesn't allow for any physical expression other than gross body movement. I like Younghyun's project because it is designed for someone for whom gross body movement *is* his form of physical expression.

# Video mirrors

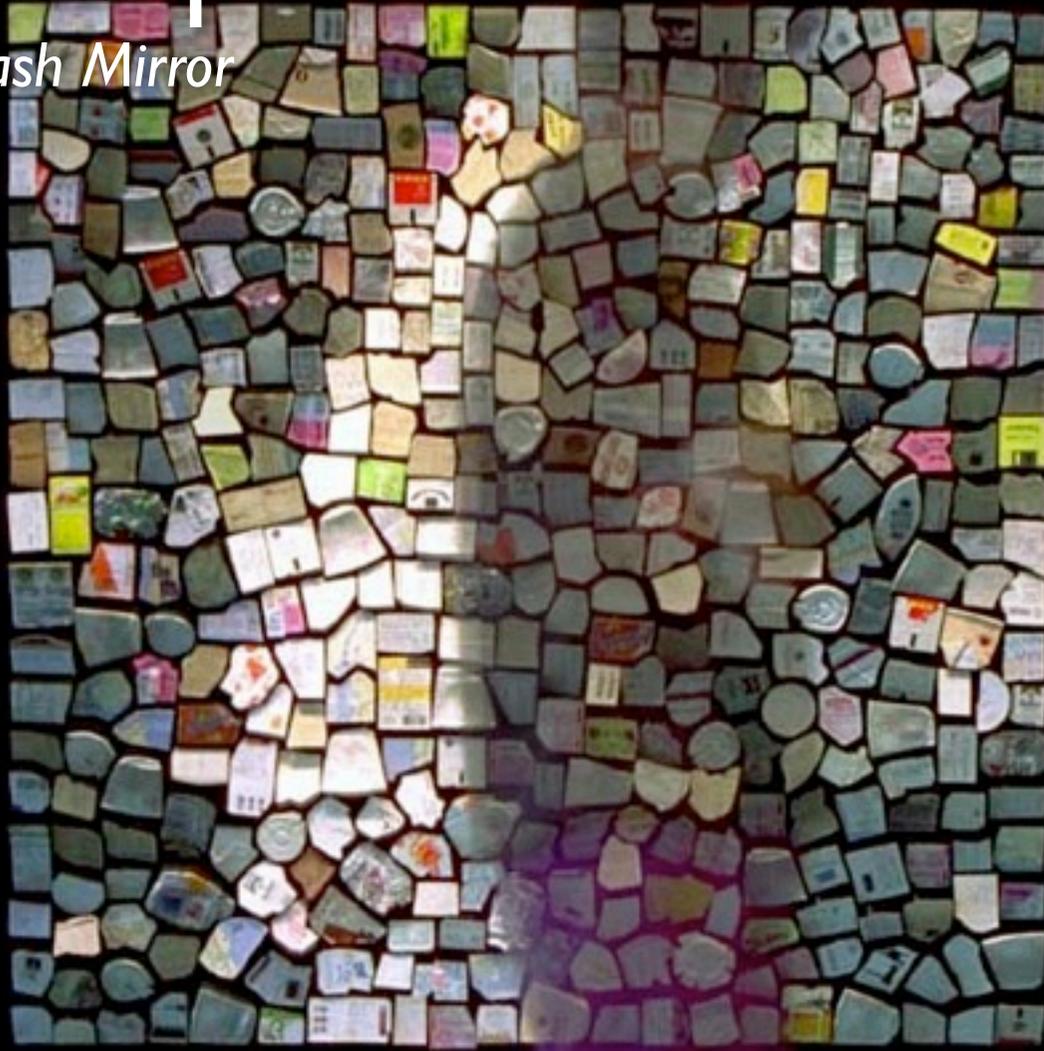
Tom Igoe, *Eye Thing*



Video mirrors are the screen-savers of physical interaction. They're very pretty, and you can stare at 'em all day. I call them hand-wavers. There's generally very little object detection going on, they're just mirroring your movement. Notable exception: Camille Utterback and Romy Achituv's "Text Rain"

# Mechanical pixels

Daniel Rozin, *Trash Mirror*



Mechanical pixels are a follow-on from video mirrors, thanks in part to Danny Rozin. Once you can move one thing, it seems really cool to move lots of things and make a picture out of them. Everyone wants to automate those Spencer Gifts pinboards. The trick to doing this well is to have mechanical precision, money, and patience. Not all of them are about human physical expression, though.

(maybe use danny here)

# Hand-as-cursor (and wands)

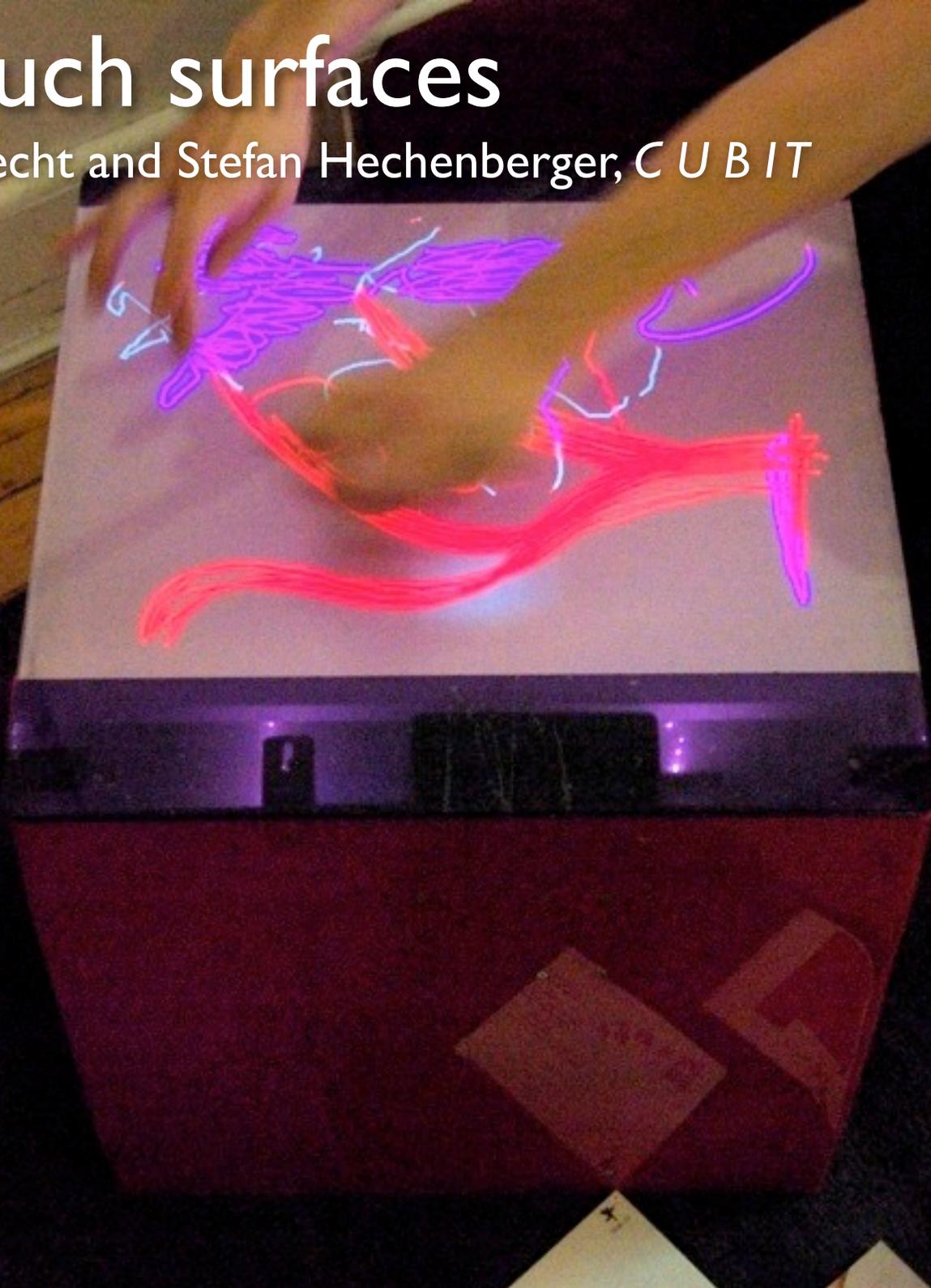
Dan Phiffer and Mushon Zer-Aviv, *Atlas Gloves*



With hand-as-cursor, we get the ability to express ourselves through gesture. It's a useful form of interaction because it's relatively simple to detect and distinguish some meaningful gestures, like pointing.

# Multi touch surfaces

Addie Wagenknecht and Stefan Hechenberger, *CUBIT*



Of course the follow-on from hand-as-cursor are multitouch surfaces, right? Of course, there's a limit to both of these gestural interfaces. Try operating your iPhone while it's in your pocket sometime and tell me that multitouch surfaces aren't limited. Also, how many blind people have you seen with an iPhone? That said, I think Addie and Stefan did a great job with this.

# Tilty stands and tables

Erin Ha Kim, *In & Out*



Well if you can't touch it, tilt it! I think tilty stands are a response to our desire to break furniture.

# Tilty Controllers

Michael Sharon, *Pierrophone*



Things that react to the orientation of a part of your body. These are best when designed for a specific action, generally, but the Wii has managed to blow that away by mapping a generic controller to a whole range of specific behaviors.

# Things you yell at

Chris Paretti, *SpeedDial*



It's amazing how much fun it is to yell at things, and how easy it is to take a sound level reading and to convert it into physical action.

# Meditation helpers

Jeff Sable, *Compass-Ion-Organ*



Dan O'Sullivan talks about unconscious computing, meaning sensing the physical expression we give off unconsciously. The most popular thing in this area is the meditation helper, where a system detects your heart rate, breath, brain waves, or posture (in this case) and uses it to drive a responsive display or musical track.

# Fields of grass

Terence Arjo, *Cousteau*



This one comes up all the time: “I want to make a field of grass that you run your hand over, that responds to where your hand is.” Why? Because the idea of a responsive texture is magical. Terence’s piece is one of the most pleasant of these I’ve seen.

# Dolls (and pets)

Noriaki Okada and Soyoung Park,  
*Interactive Dolls*



Interactive dolls and pets are popular because we like things that appear to respond to us in anthropomorphic ways. We like pets, and if we can build them to respond how we want and not poop or scratch the furniture, all the better.

# Remote Hugs

Emily Conrad and Oli Stephensen, *HeartBeat*



Paired objects that send an abstraction of your feelings across the network come up all the time. Clay Shirky describes these as “phatic communication stripped of verbal language.” I have no idea why they’re so popular. I guess we all want to share the love.

# LED Fetishism

Vikram Tank and Ithai Benjamin, *Set in Stone*



We're all guilty of doing the gratuitous LED project, it's too much fun. When -- not if -- you do it, make it interesting. Embed them in concrete or something like that.

# Thanks

to you for listening  
to all the ITP students  
whose work makes mine so much fun

more info:  
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