

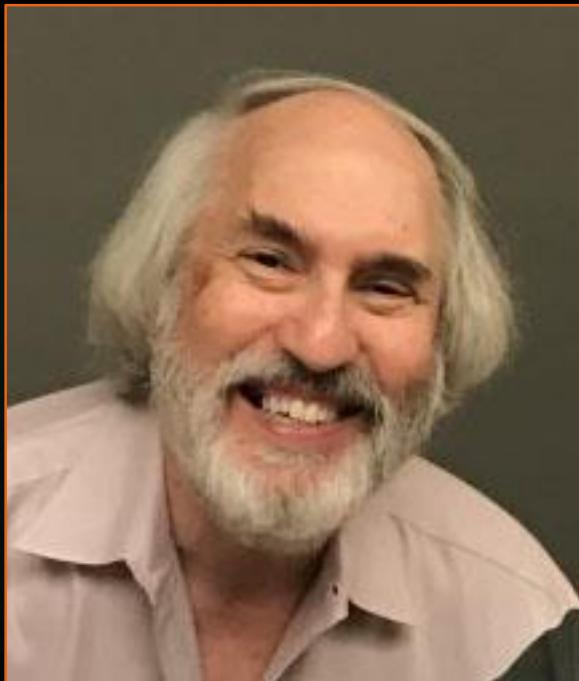


February 11, 2021

The Design and Control of Exoskeletons for Rehabilitation

ENGR110/210

Perspectives in Assistive Technology



David L. Jaffe, MS
Instructor

15
Years

Questions?



Please notify me of your comments, suggestions, and concerns so I can explain / address / correct them.

Age-Related Ability



- ▶ I'm getting my COVID vaccination on Tuesday!



Age-Related Disability Intolerance to Spinning





- ▶ Let me know if you are unable to arrive on time or must leave early
- ▶ Review slides and watch Zoom video of missed portion of the class session
- ▶ Make up missed class sessions



Upcoming class sessions



- ▶ Tue, Feb 16th
Mid-term Student Project Presentations
- ▶ Thu, Feb 18th
Aesthetics Matter & Empathy and Problem Definition
Jules Sherman
- ▶ Tue, Feb 23rd
Improving Home Environments for Older Adults
Matteo Zallio, M.Arch, PhD

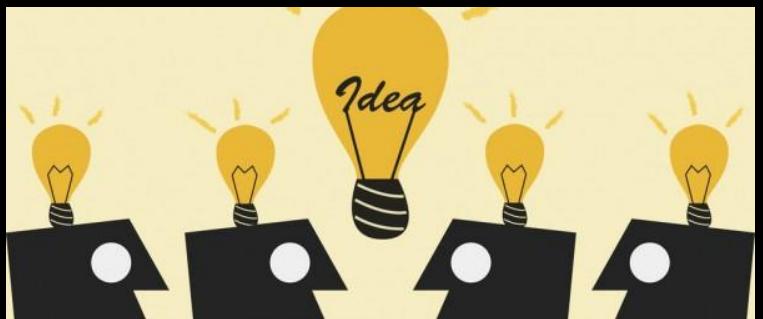


Students working on projects

Expected Activities for Fabrication Projects



- ▶ Connect with project partner
- ▶ “Understand the Problem”
- ▶ Brainstorming
- ▶ Select Design Concept(s)
- ▶ Sketches, low resolution prototypes
- ▶ Preparing for Mid-Term presentation and Report



Students working on projects

Mid-term Presentations Update



- ▶ Mid-term presentations will be 3 minutes, no slides, no screen sharing, informal, not graded – **but be professional**
- ▶ Be concise, avoid every detail
- ▶ “Elevator Pitch” & Update the Boss
- ▶ Include feeling & emotion
- ▶ Presentation order from Signup Sheet
- ▶ **Practice for timing**



Students working on projects

Mid-term Report Update



- ▶ Mid-term report - **10 pages maximum** - of narrative submitted collectively by all students working on the same project
- ▶ Suggested format different for fabrication vs non-fabrication projects
- ▶ Include sketches and photos
- ▶ Goal: short, concise, well-written, and highly readable report with few grammatical and spelling errors.
- ▶ Report Writing Tips document sent by email

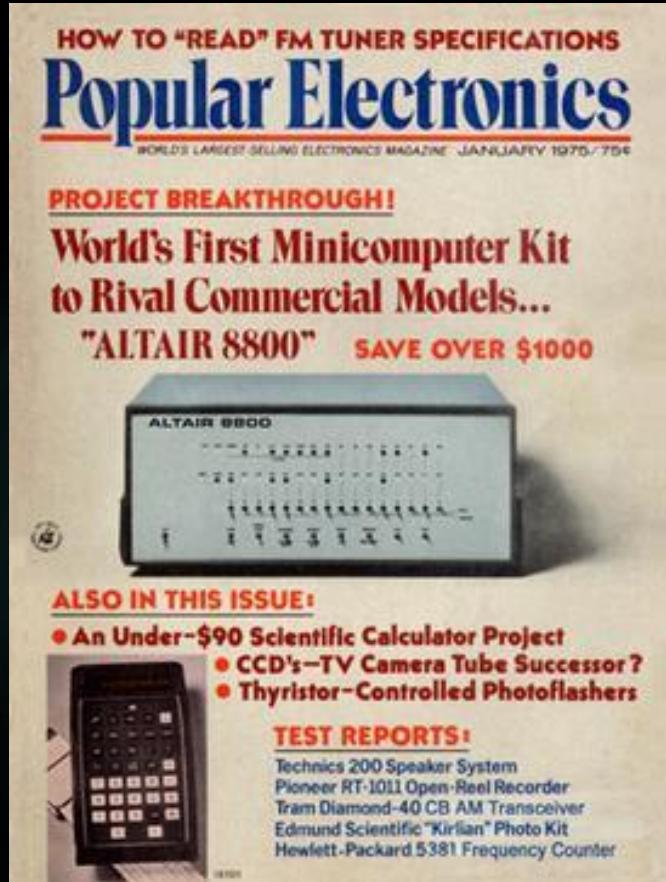
Reminder - Work with Diligence



- ▶ Time is your most precious resource
- ▶ Five days until Mid-term Presentations - Tue, Feb 16th
- ▶ Practice your presentation!

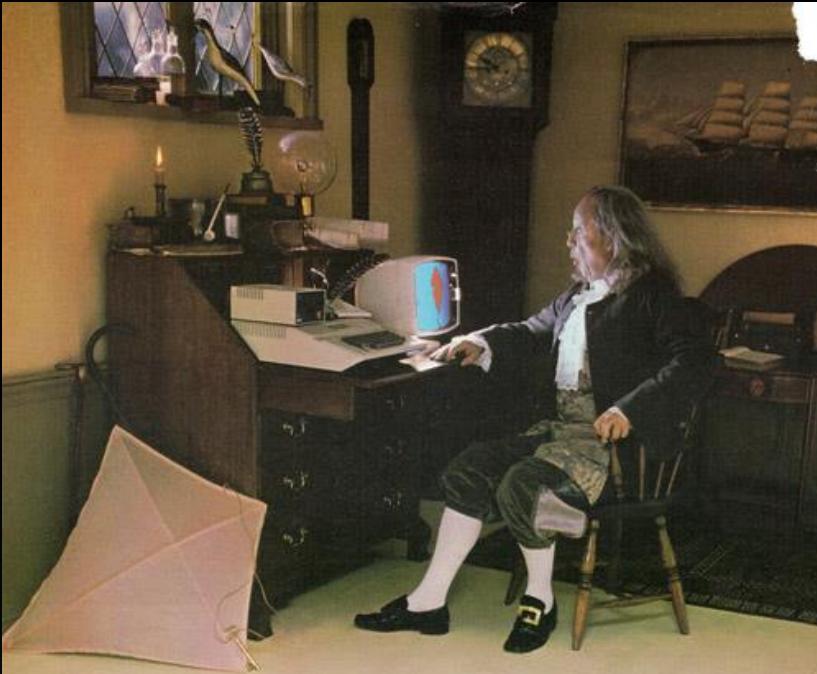


Vintage Technology



46 years ago!

Vintage Computer Technology



What kind of man owns his own computer?

Rather revolutionary, the whole idea of owning your own computer? Not if you're a diplomat, printer, scientist, inventor... or a kite designer, too. Today there's Apple Computer. It's designed to be a *personal* computer. To uncomplicate your life. And make you more effective.

It's a wise man who owns an Apple.

If your time means money, Apple can help you make more of it. In an age of specialists, the most successful specialists stay away from uncreative drudgery. That's where Apple comes in.

Apple is a real computer, right to the core. So just like big computers, it manages data, crunches numbers, keeps records, processes your information and prints reports. You concentrate on what you do best. And let Apple do the rest. Apple makes that easy with three programming languages—including Pascal—that let you be your own software expert.

Apple, the computer worth not waiting for.

Time waiting for access to your company's big mainframe is time wasted. What you need in your department—

on your desk—is a computer that answers only to you... Apple Computer. It's less expensive than timesharing.

More dependable than distributed processing.

Far more flexible than centralized EDP. And, at less than \$2500 (as shown), downright affordable.

Visit your local computer store.

You can join the personal computer revolution by visiting the Apple dealer in your neighborhood. We'll give you his name when you call our toll free number:

(800) 538-9696. In California,

(800) 662-9238.

Apple Computer, 10260
Bandley Drive,
Cupertino,
CA 95014.

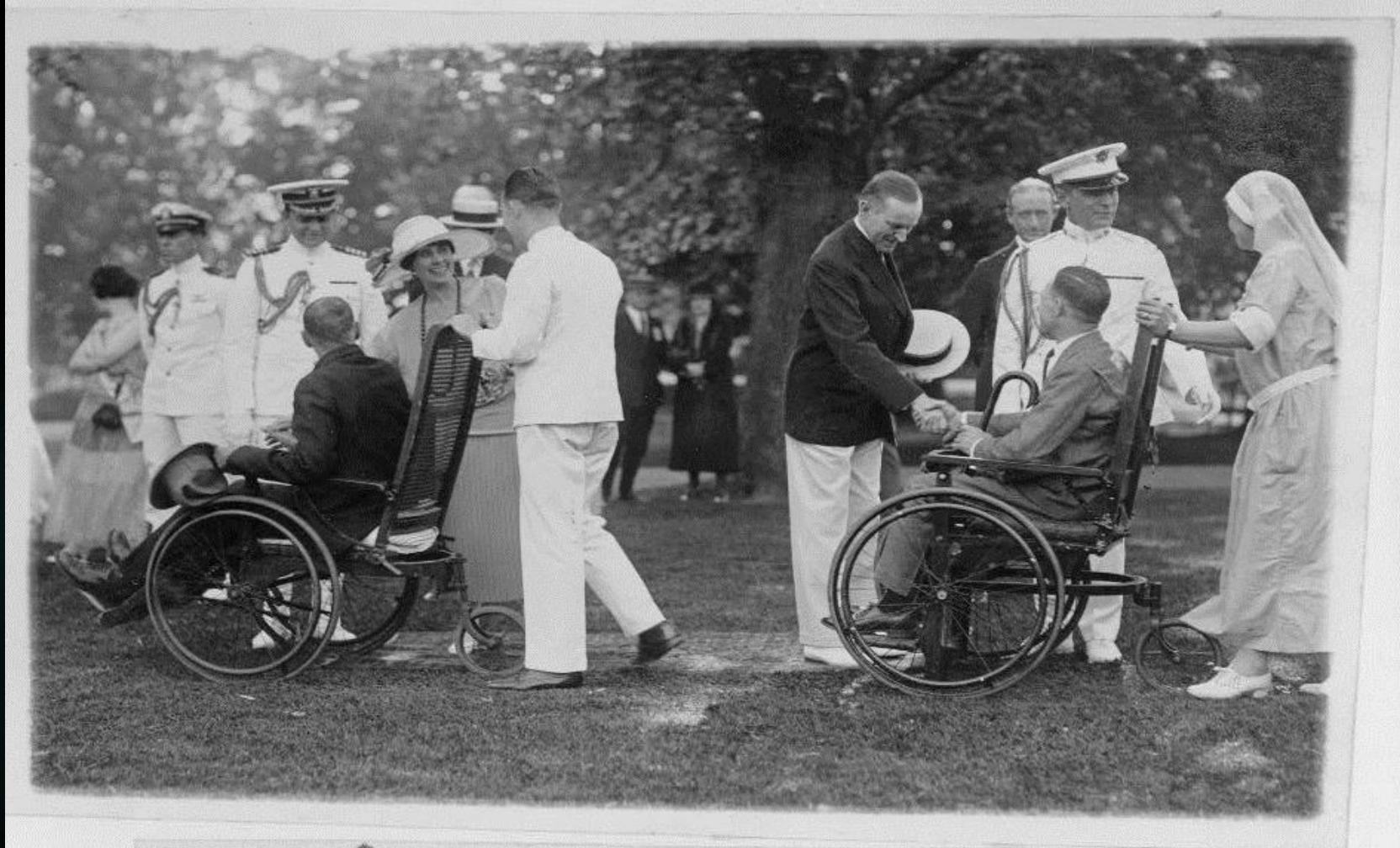


Vintage Assistive Technology

Old Wheelchair Designs



Old Wheelchair Designs



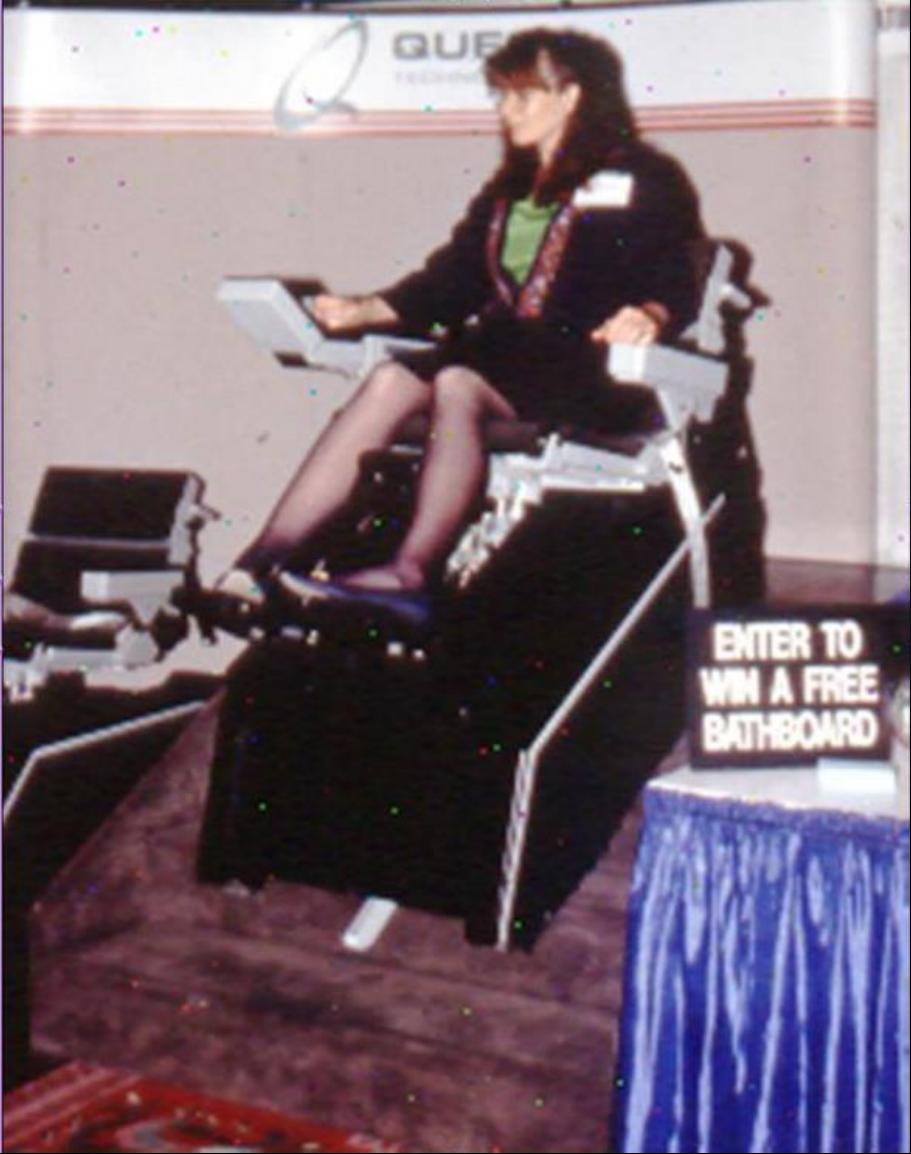
Garden party for Wounded men at the
White house 6/5/24 30963



Old Wheelchair Designs



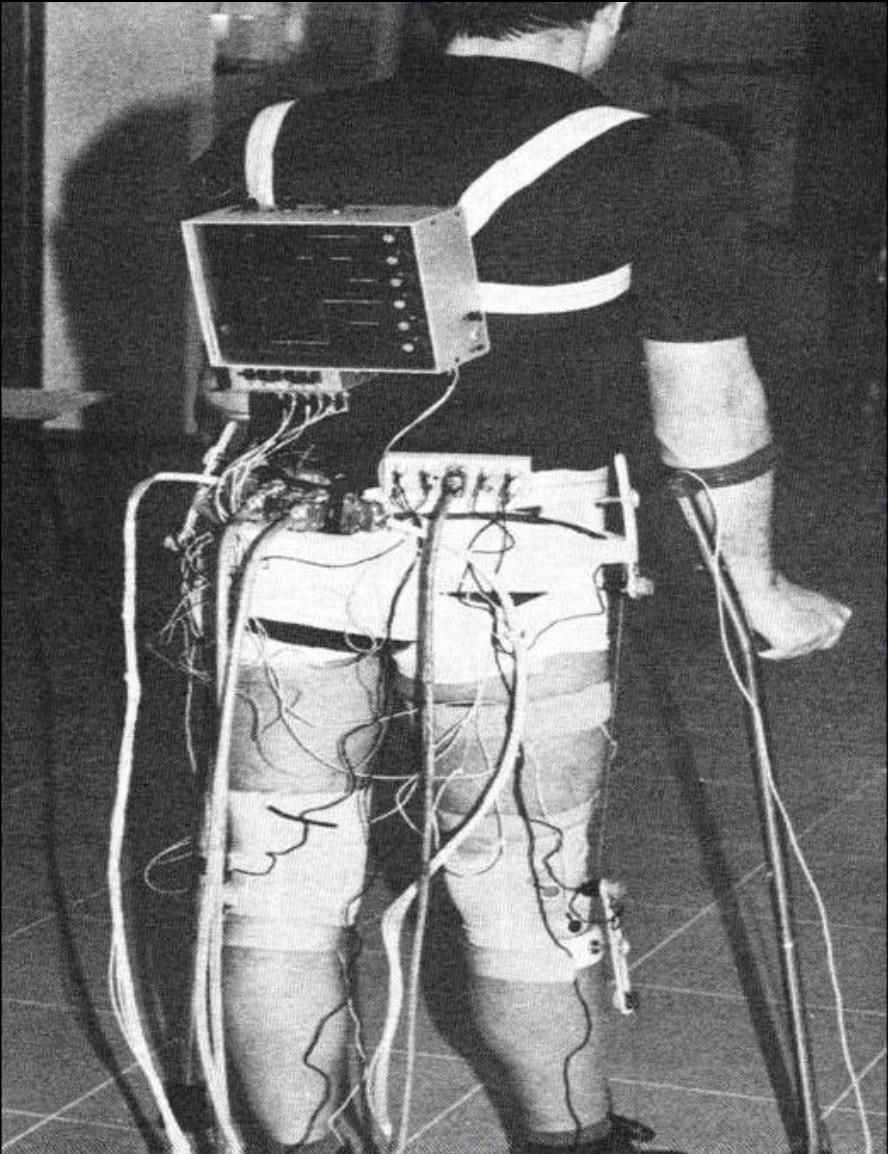
Old Wheelchair Designs



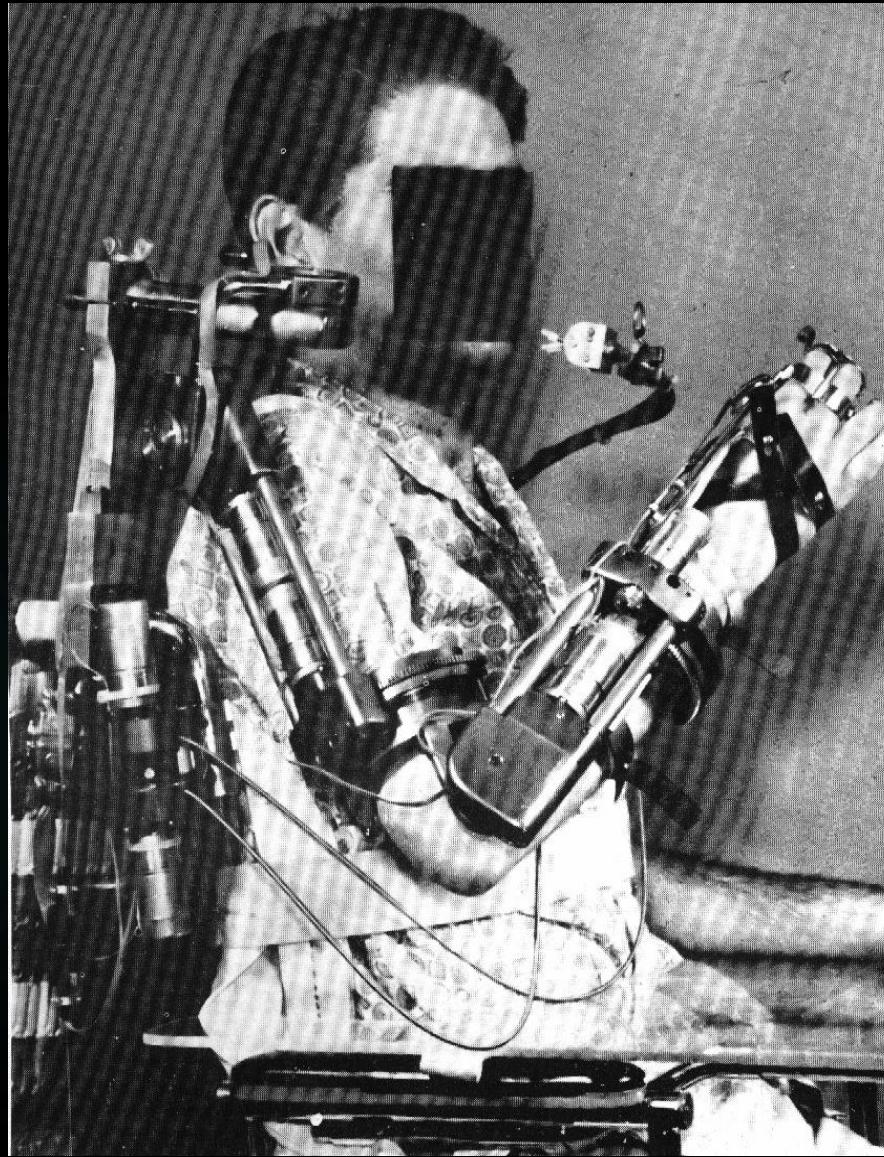
Omni-directional Wheelchairs



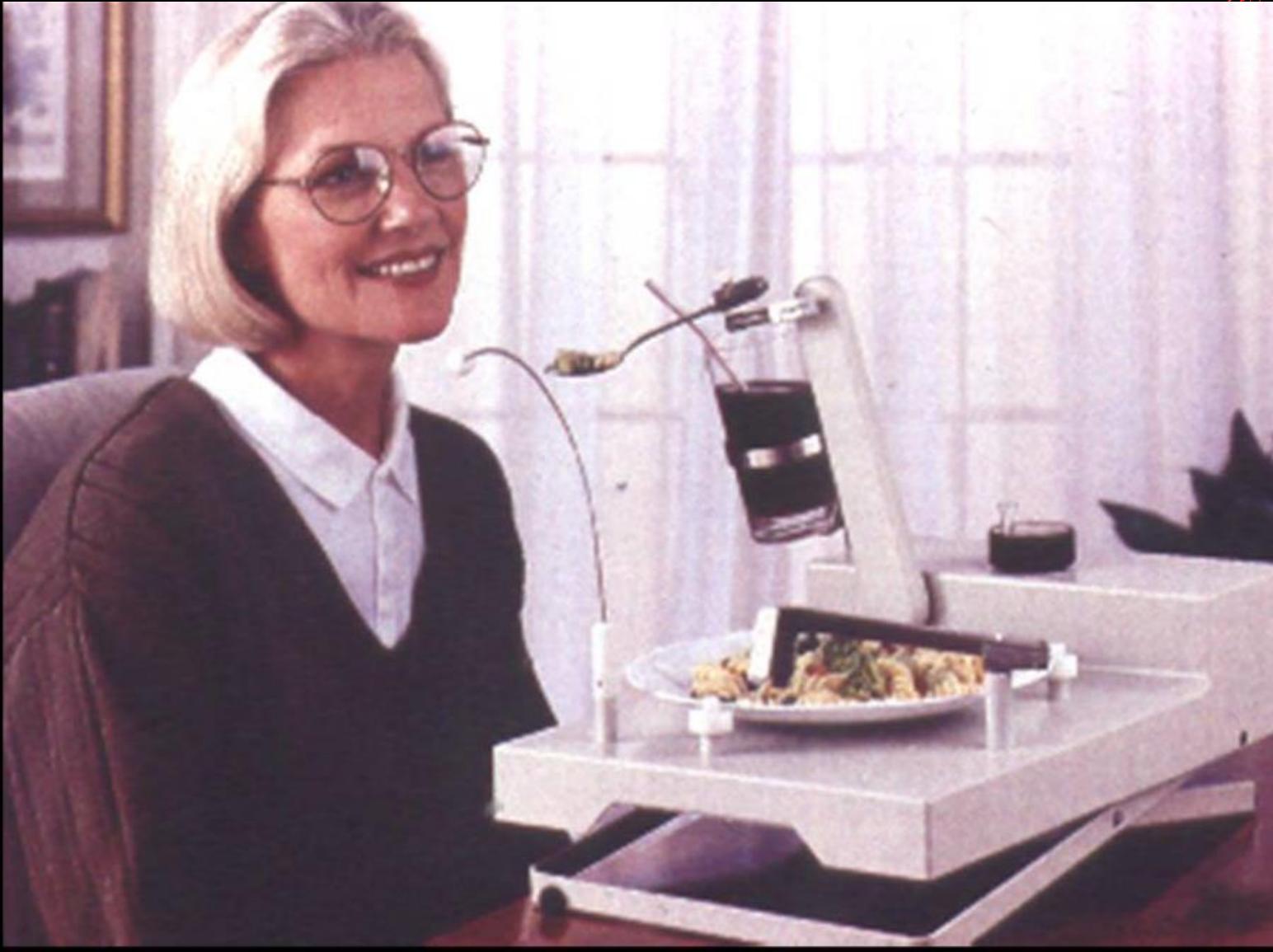
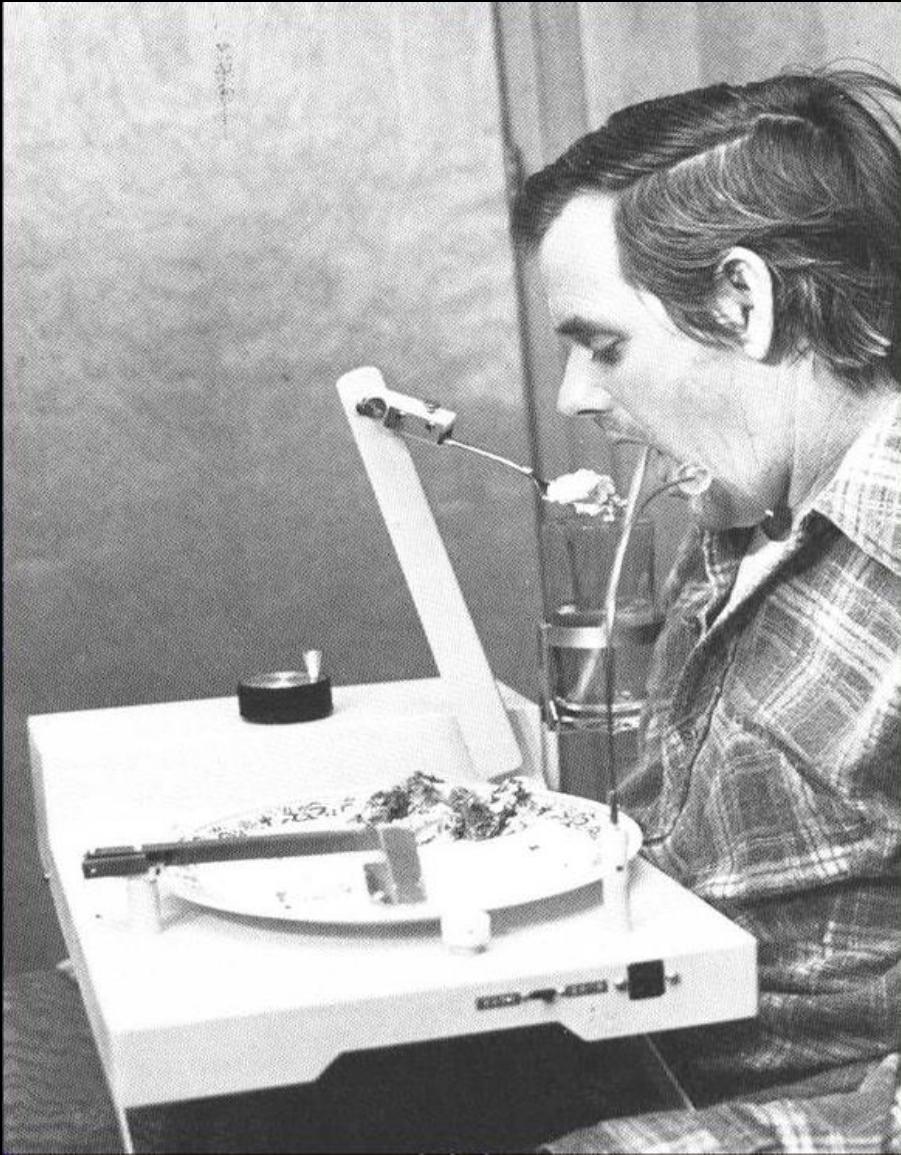
FES Walking



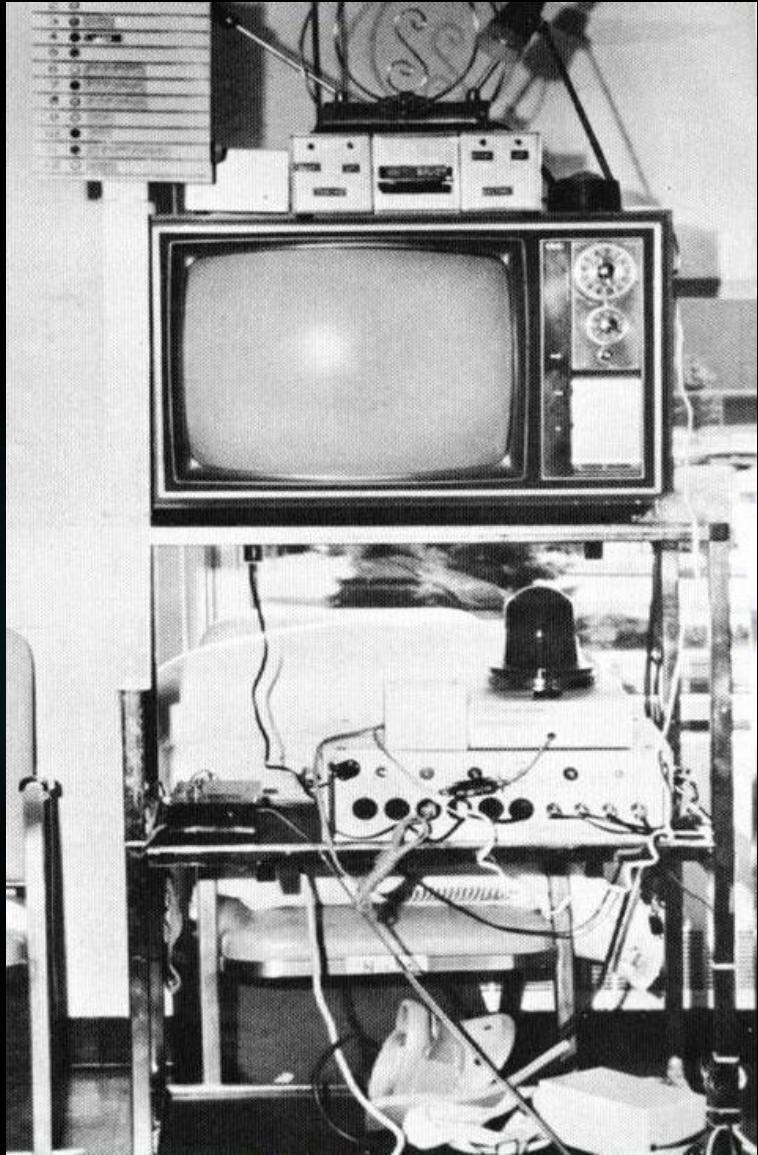
Chin Controlled Arm Exoskeleton



Robotic Feeding Aids



Early Environmental Control Systems



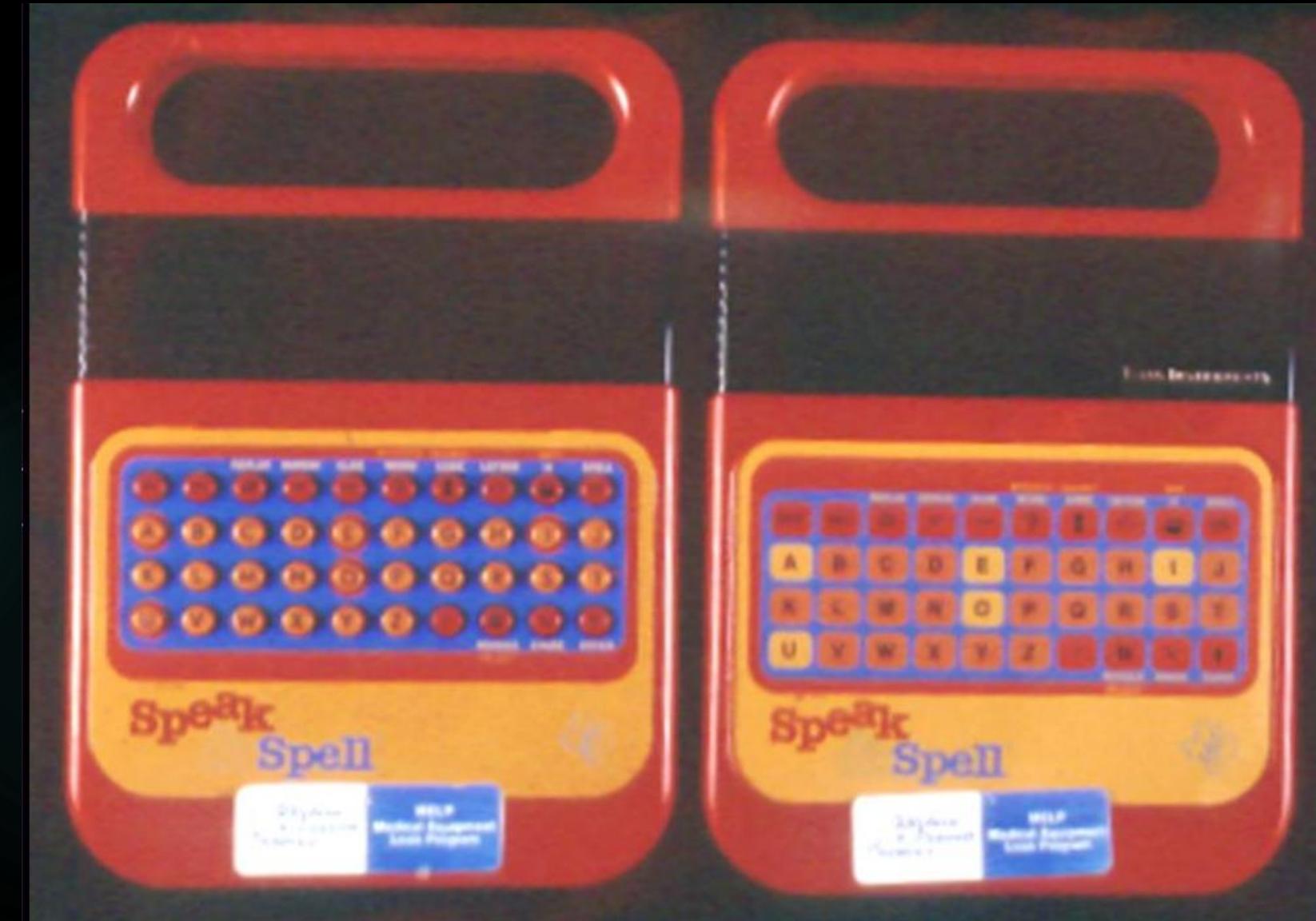
Eye Gaze Control



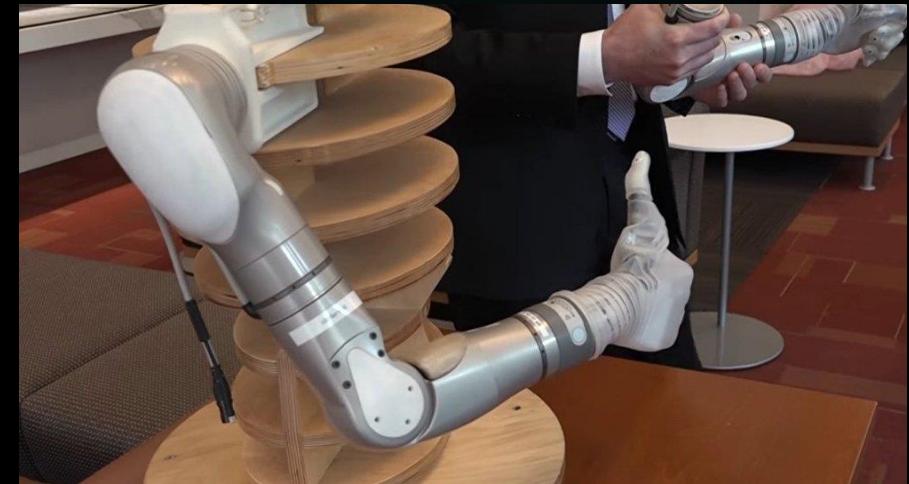
Augmented Communication System



Augmented Communication System



Artificial Arm from 1560 - 1600



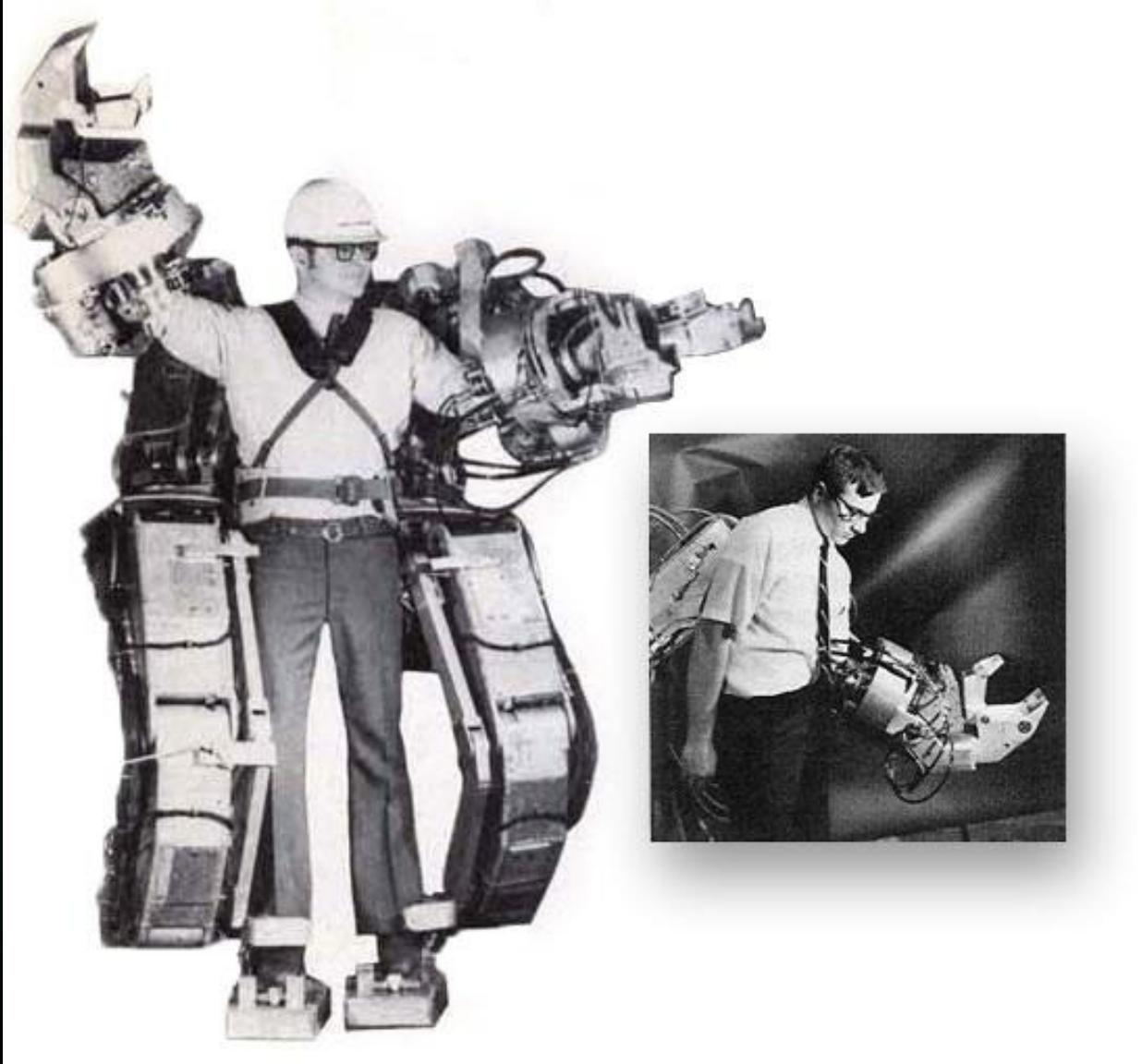
Peg Leg Bates



Wooden Prosthetic Legs



Hardiman Prototype - 1950s



Student Exoskeleton Arms



Ultimate Exoskeleton



Ultimate Hand Orthotic



Space,
Time,
Reality,
Mind,
Soul,
and
Power.



Thanos' Infinity Gauntlet



Steampunk Professor Xavier Wheelchair Project



Steam Punk Professor Xavier's Wheelchair
By: Daniel Valdez
<http://www.smeeon.com/>

[Video](#)

Orange County Chopper



- ▶ Christopher & Dana Reeve Foundation
- ▶ [Video](#)



Tuesday, February 16th



Mid-term Student Project Presentations
19 projects

Today



The Design and Control of Exoskeletons for Rehabilitation

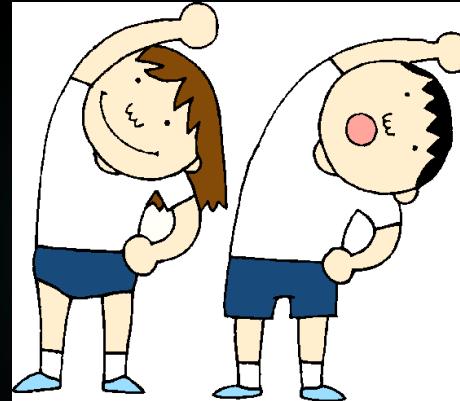
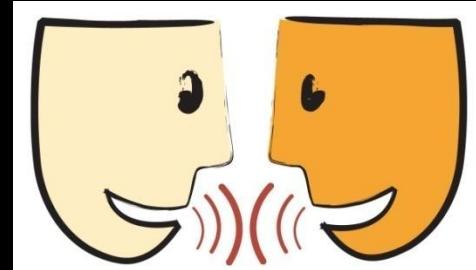
Katherine Strausser, PhD

Ekso Bionics – Principal Controls Engineer



Break Activities

- ▶ Breakout rooms
- ▶ Attendance sheet
- ▶ Stand up and stretch
- ▶ Take a bio-break
- ▶ Text message
- ▶ Web-surf
- ▶ Respond to email
- ▶ Talk with classmates
- ▶ Reflect on what was presented in class



Short Break

