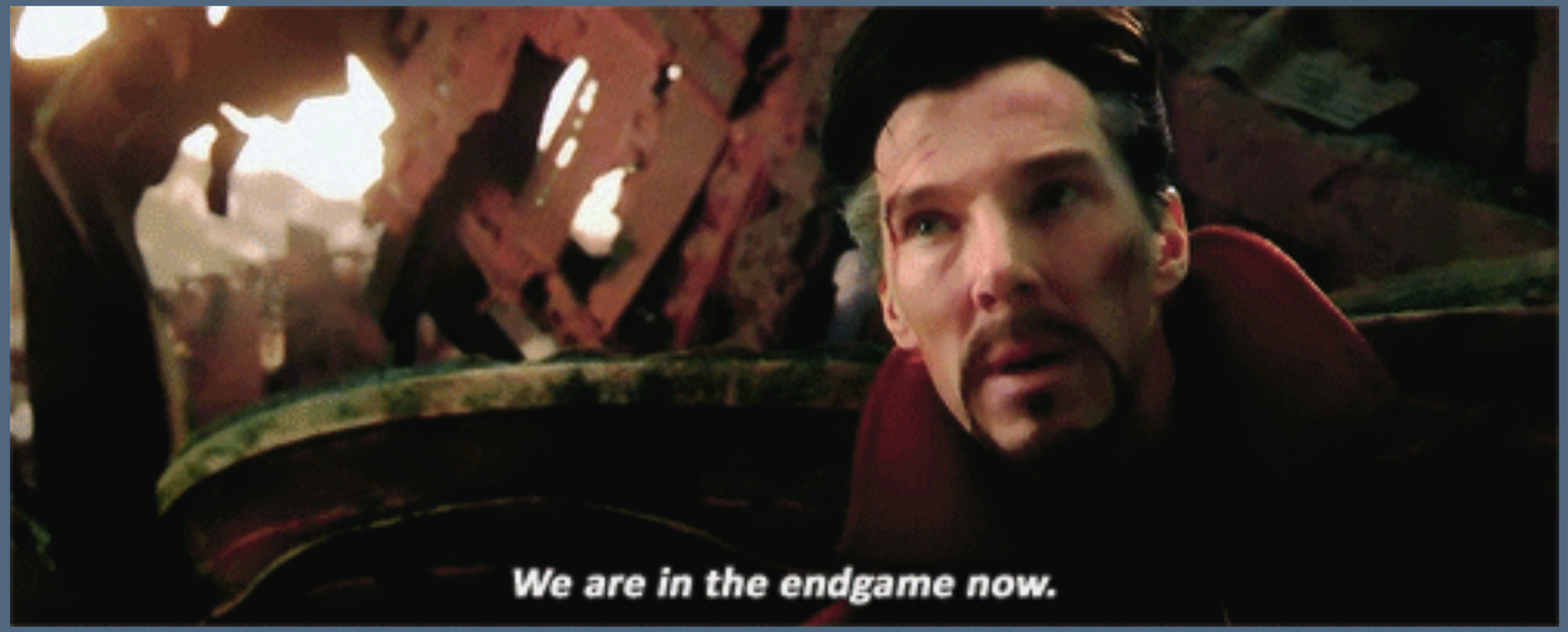
Something Old, Something New

CS 347

Michael Bernstein

Announcements



Final next Thursday at 3:30pm in this room

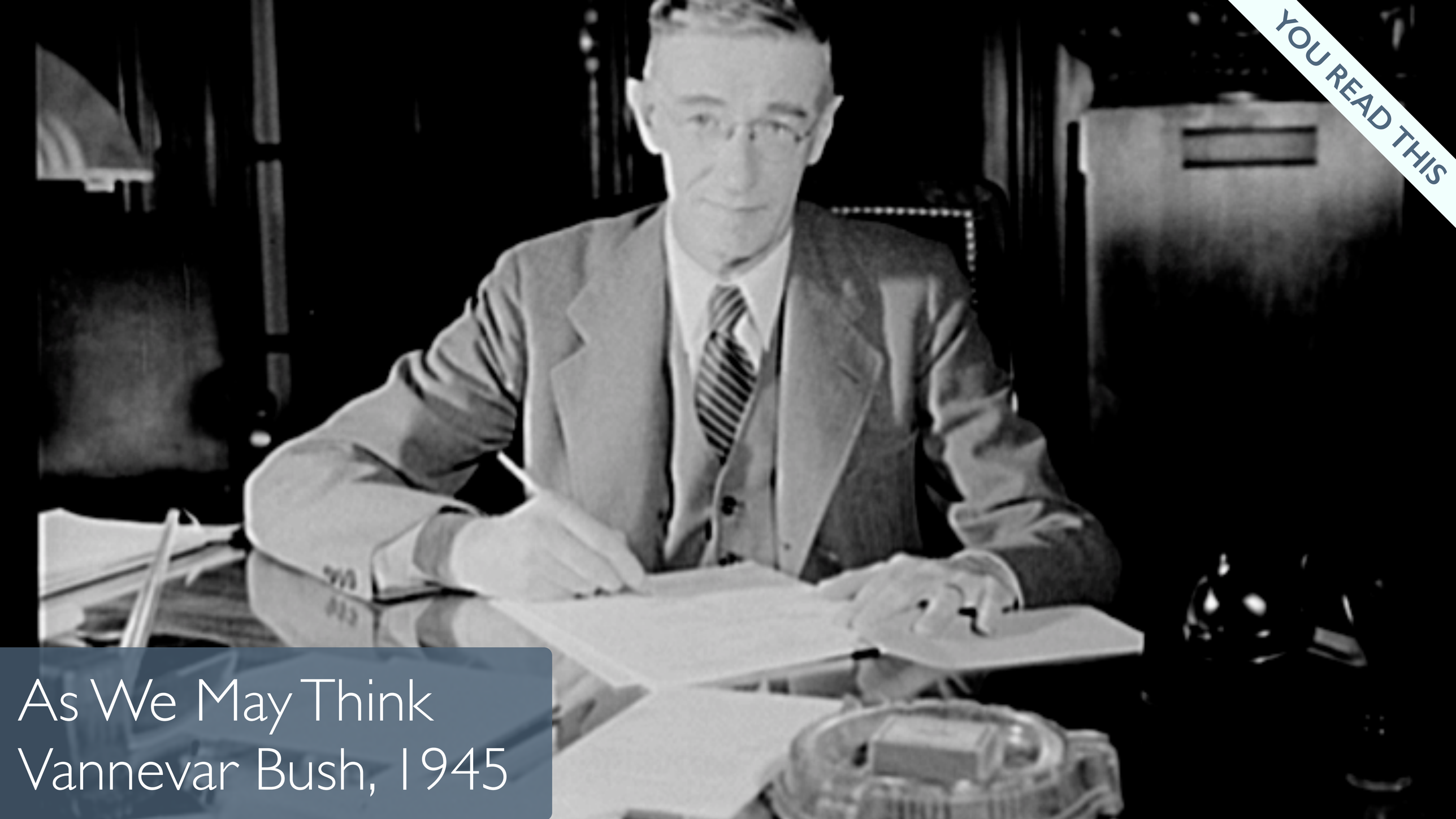
Something Old

Let’s tie this all together.

Let's start with Vannevar Bush in 1945

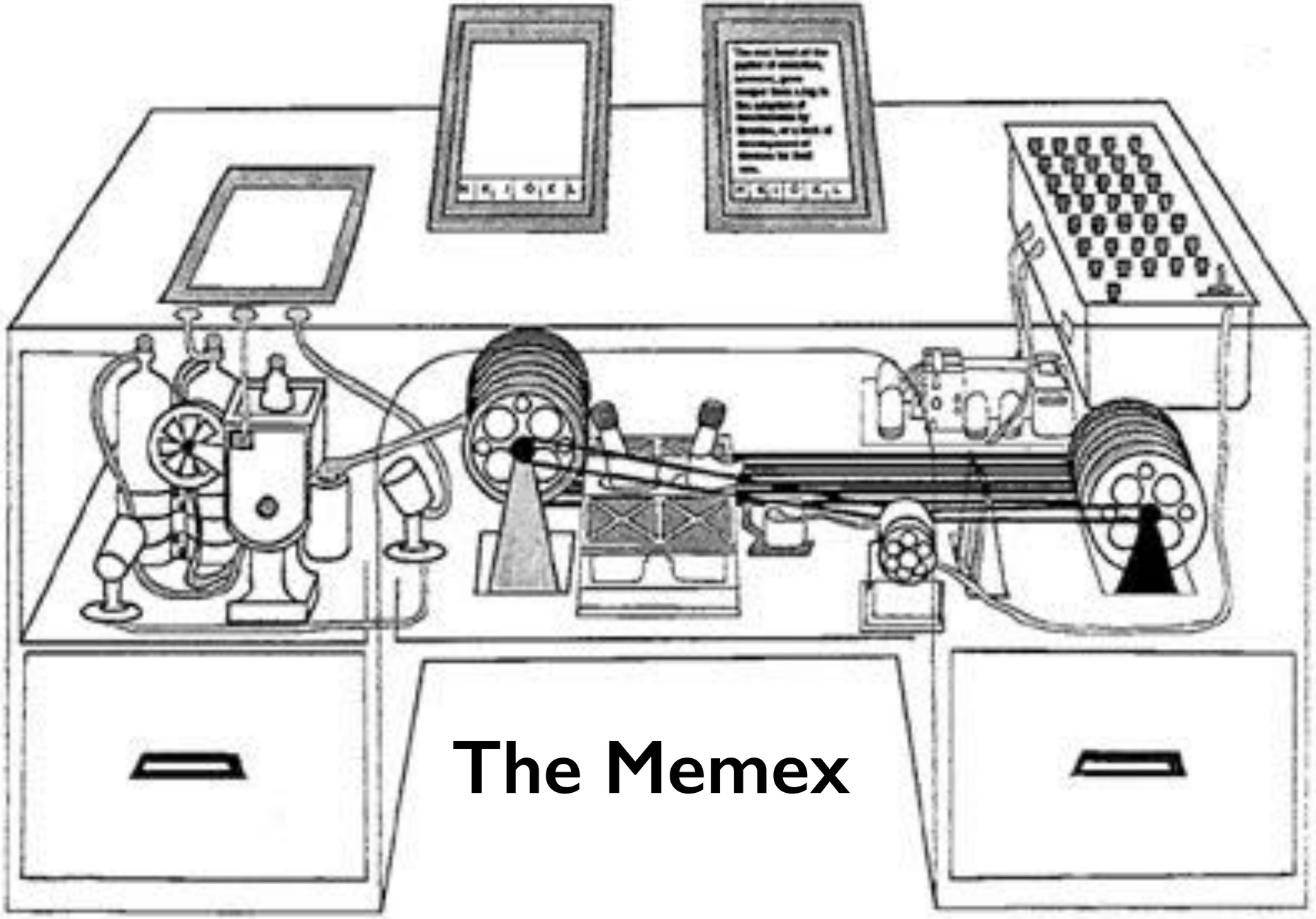
Bush: MIT Professor who established the social contract for science: government funds universities, universities do basic science, basic science benefits the national interest

Bush had been in charge of the scientific effort for WWII, and returning to peacetime, was left thinking about what role technology really should play in society.

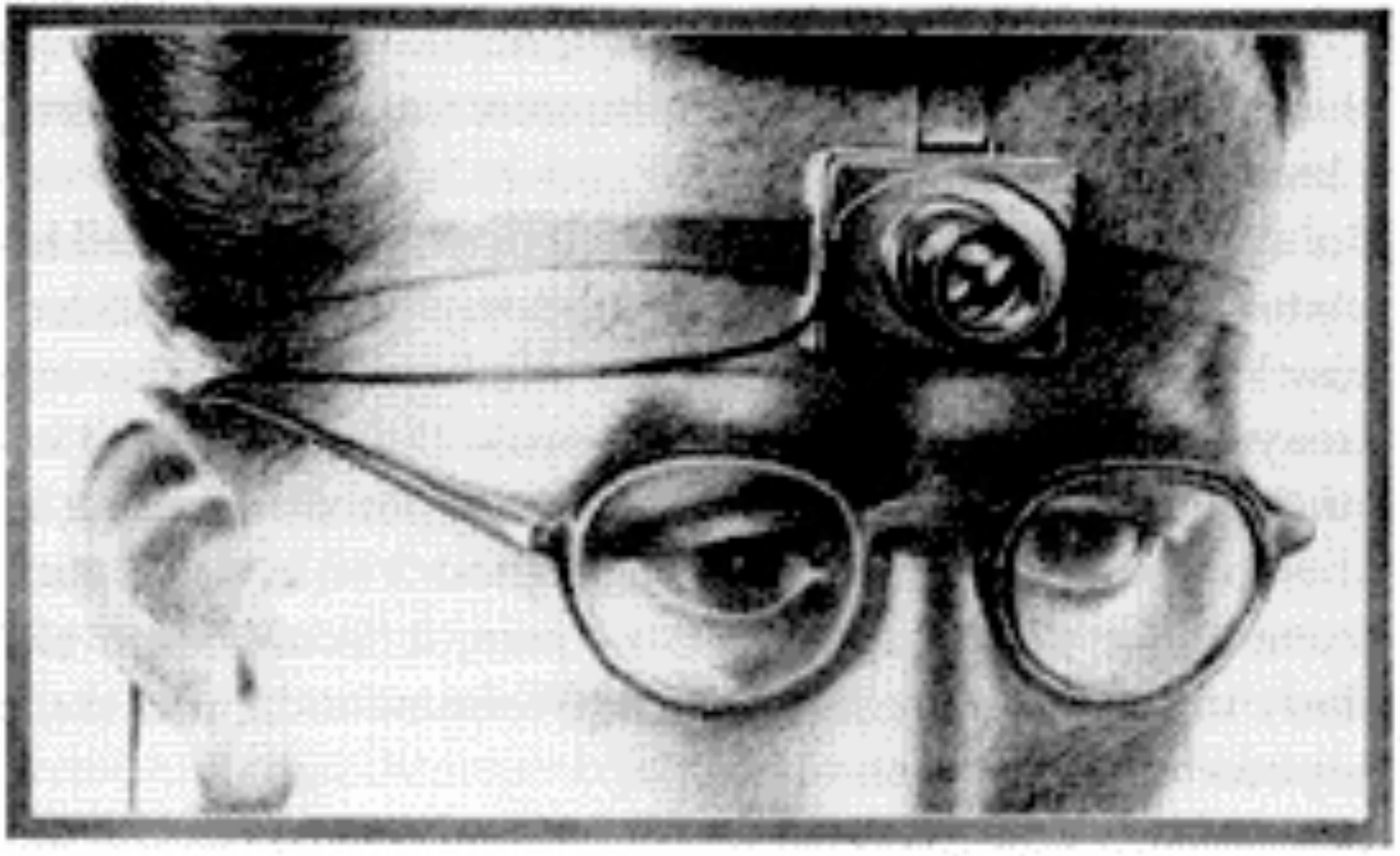


YOU READ THIS

As We May Think
Vannevar Bush, 1945



The Memex



A scientist of the future records experiments with a tiny camera fitted with universal-focus lens. The small square in the eyeglass at the left sights the object (*LIFE 19*(11), p. 112).

"There is a new profession of **trail blazers**, those who find delight in the task of establishing useful trails through the enormous mass of the common record. The **inheritance** from the master **becomes**, not only his **additions to the world's record**, but for his disciples the entire scaffolding by which they were erected."

“Wholly new forms of encyclopedias will appear, ready-made with a mesh of associative trails running through them.”

Memex inspires Ivan Sutherland

Bush: 1945
Sutherland: 1963

Sketchpad
Ivan Sutherland

Sword of Damocles
Ivan Sutherland

Bush and Sutherland inspire Doug Engelbart

Reads Bush's article right after starting as a Navy technician

Bush: 1945
Sutherland: 1963
Engelbart: 1968

Introduction

Overall about Program

NLS as an "Instrument"

Control techniques

NLS Implementation

Usage

Activities

Credits

NLS: Mouse, Hypertext

CONTROL TECHNIQUES
CONTROL DEVICES
CONTROL DIALOGUE
CONTROL METALANGUAGE

NLS Demo

Doug Engelbart, 1968

AUGMENTING HUMAN INTELLECT: A CONCEPTUAL FRAMEWORK

Prepared for:

DIRECTOR OF INFORMATION SCIENCES
AIR FORCE OFFICE OF SCIENTIFIC RESEARCH
WASHINGTON 25, D.C.

CONTRACT AF 49(638)-1024

By: *D. C. Engelbart*

STANFORD RESEARCH INSTITUTE

MENLO PARK, CALIFORNIA

Man-Computer Symbiosis*

J. C. R. LICKLIDER†

Summary—**Man-computer symbiosis is an expected development in cooperative interaction between men and electronic computers. It will involve very close coupling between the human and the electronic members of the partnership. The main aims are 1) to let computers facilitate formulative thinking as they now facilitate the solution of formulated problems, and 2) to enable men and computers to cooperate in making decisions and controlling complex situations without inflexible dependence on predetermined programs. In the anticipated symbiotic partnership, men will set the goals, formulate the hypotheses, determine the criteria, and perform the evaluations. Computing machines will do the routinizable work that must be done to prepare the way for insights and decisions in technical and scientific thinking. Preliminary analyses indicate that the symbiotic partnership will perform intellectual operations much more effectively than man alone can perform them. Prerequisites for the achievement of the effective, cooperative association include developments in computer time sharing, in memory components, in memory organization, in programming lan-**

will be coupled together very tightly, and that the resulting partnership will think as no human brain has ever thought and process data in a way not approached by the information-handling machines we know today.

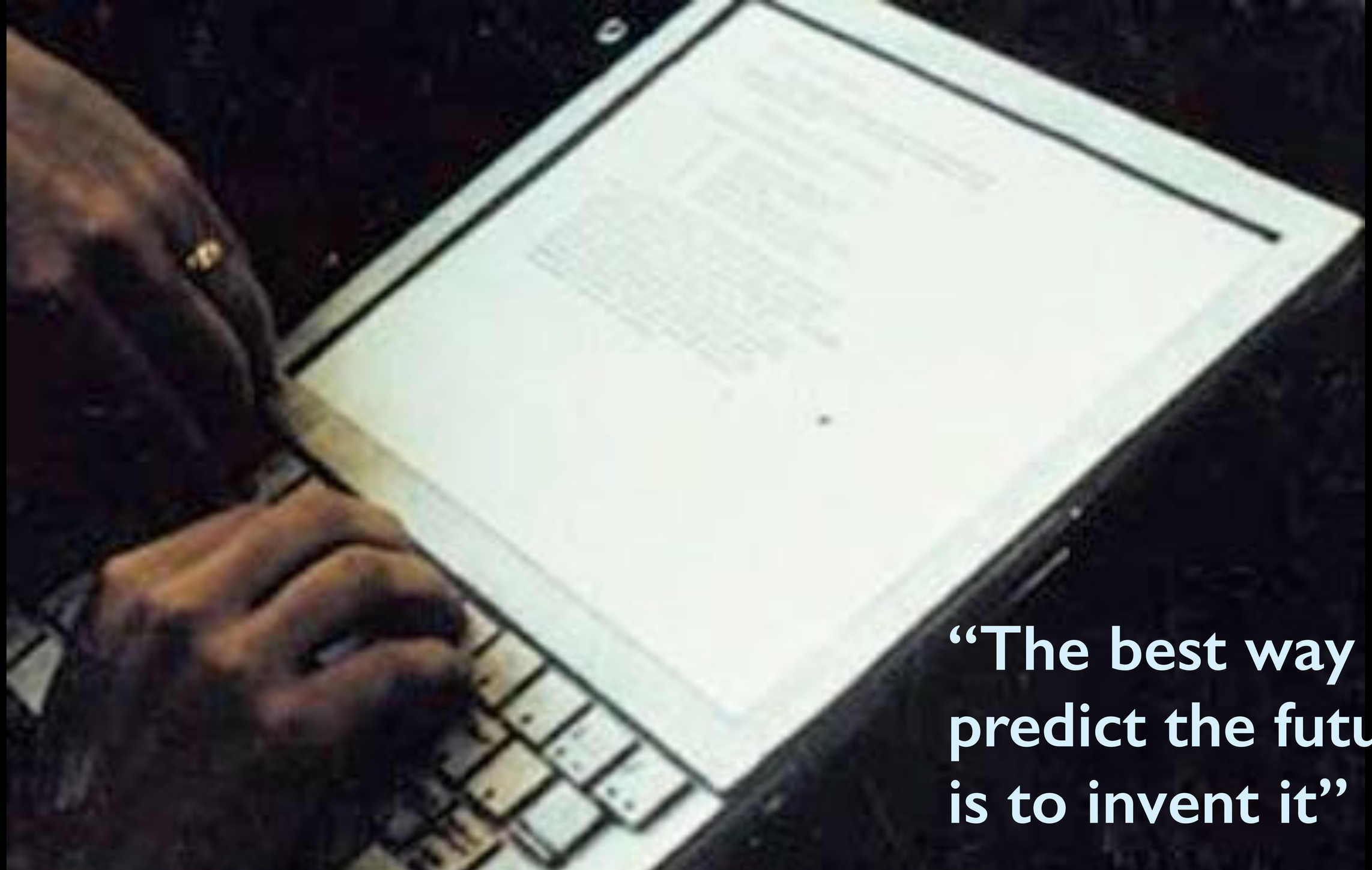
B. Between "Mechanically Extended Man" and "Artificial Intelligence"

As a concept, man-computer symbiosis is different in an important way from what North[2] has called "mechanically extended man." In the man-machine systems of the past, the human operator supplied the initiative, the direction, the integration, and the criterion. The mechanical parts of the systems were mere extensions, first of the human arm, then of the human eye. These systems certainly did not consist of "dissimilar organ-

Engelbart inspires Sutherland's PhD advisee Alan Kay

Bush: 1945
Sutherland: 1963
Engelbart: 1968

Kay: 1972



“The best way to predict the future is to invent it”

Xerox Star draws on Engelbart's and Kay's ideas

Bush: 1945
Sutherland: 1963
Engelbart: 1968

Kay: 1972
Xerox Star: 1981

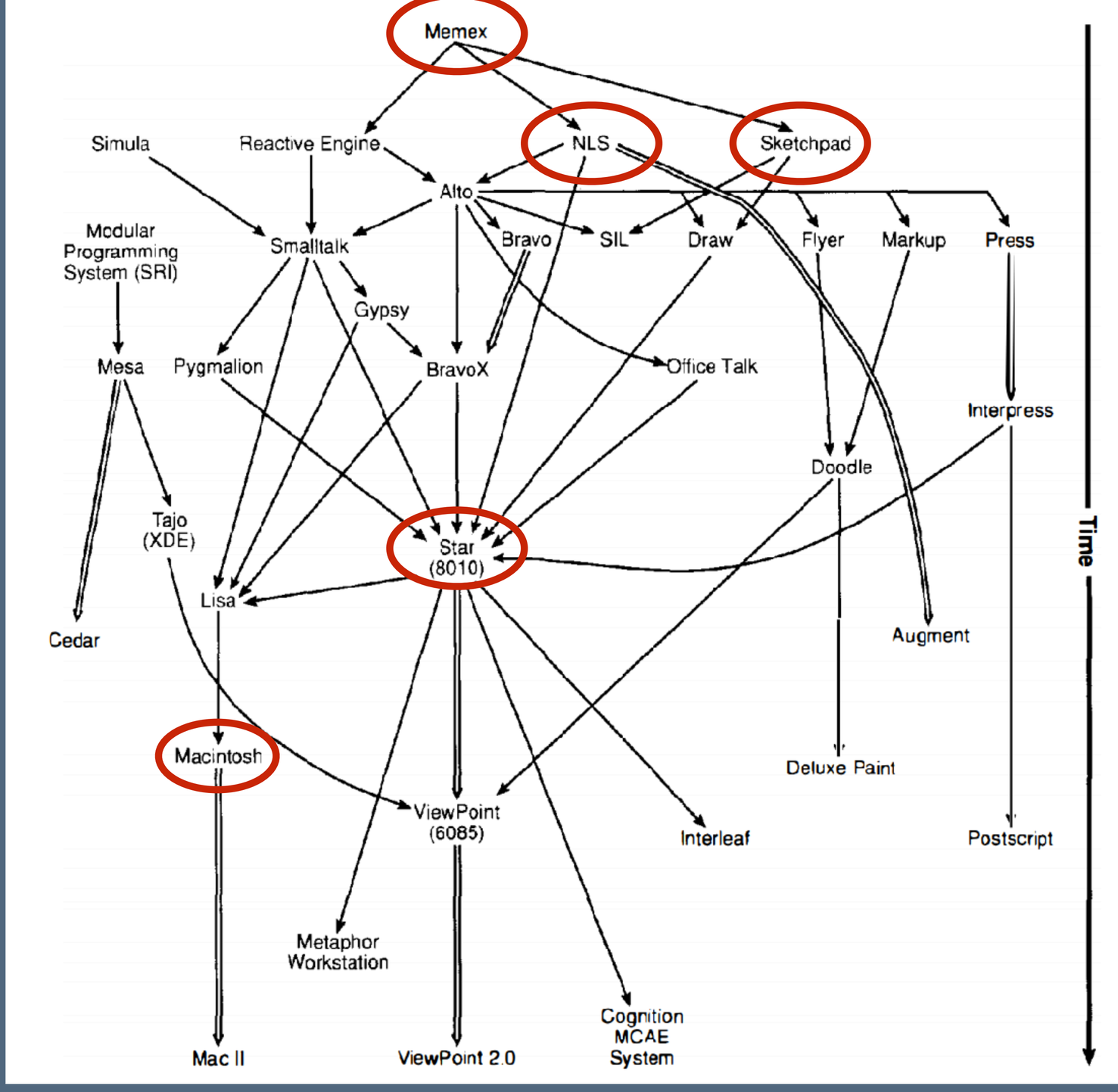
Xerox Star

Invented or popularized:

- Desktop metaphor
- Direct manipulation
- Bitmapped display
- Windows
- WYSIWYG
- Two-button mouse

Xerox Star

The Xerox Star's ancestors and descendants [Johnson et al. 1989]



Steve Jobs, 1990

Steve Jobs, 1995

Meanwhile, in Pittsburgh…

Bush: 1945
Sutherland: 1963
Engelbart: 1968

Newell: 1971
Kay: 1972
Xerox Star: 1981

Xerox
Note 1
(Correction Copy)

Allen Newell
(retyped 11 Feb

Notes on a Proposal for a Psychological Research Unit

The purpose of these notes, of which this is the first, is to act a working vehicle to explore the notion of a psychological laboratory wi a computer science oriented industrial research laboratory. The specific context is the Xerox Research Laboratory in Palo Alto.

I consider these notes to be working documents -- not the record o prior analysis, but an integral part of an analysis in progress. Hence expressed in them may be exploratory ar ' stipulative, to be contradiced ideas expressed subsequently. They may also be somewhat discursive.

Basic proposition. The central idea that these notes are to explo contained in a set of somewhat independent propositions:

(1) There is emerging a psychology of cognitive behavior that wil permit calculation of behavior in new situations and with new humans (called information processing psychology currently).

(2) Several of the tasks that are central to the activities of computing -- programming, debugging, etc. -- are tasks that appear to be within the early scope of this emerging theory.

(3) Computer science in general is extremely one-sided (for under

Stu Card does his PhD with Allen Newell

Bush: 1945
Sutherland: 1963
Engelbart: 1968

Newell: 1971
Kay: 1972
Xerox Star: 1981

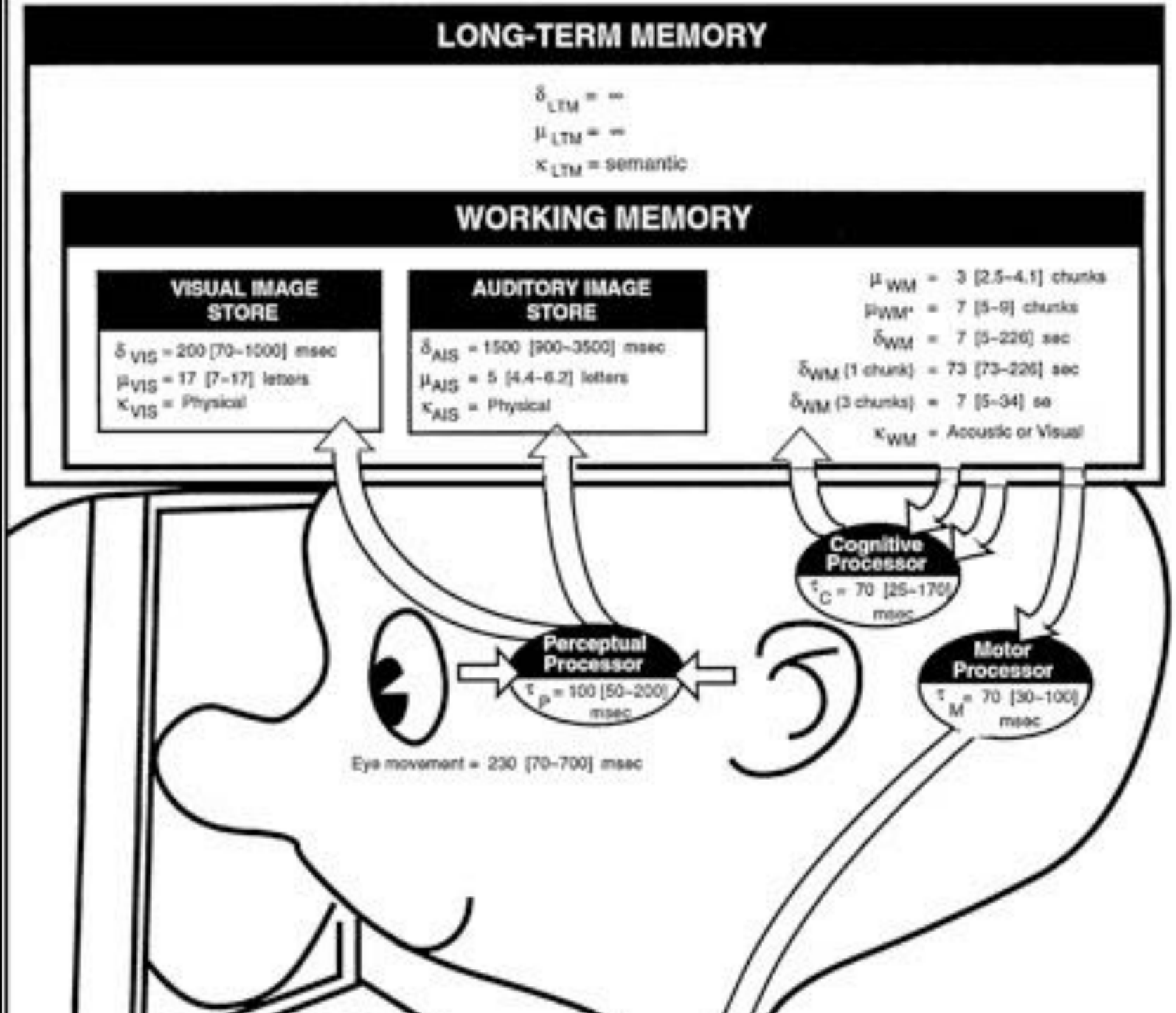
Psych. of HCI: 1983

GOMS

Book: The Psychology of Human-Computer Interaction

- Popularized the term human-computer interaction

Engineering science of HCI



CHI becomes a conference

Bush: 1945
Sutherland: 1963
Engelbart: 1968

Newell: 1971
Kay: 1972
Xerox Star: 1981

Psych. of HCI: 1983
First CHI: 1982/83

TABLE OF CONTENTS

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Direct manipulation

Bush: 1945
Sutherland: 1963
Engelbart: 1968

Newell: 1971
Kay: 1972
Xerox Star: 1981

Psych. of HCI: 1983
First CHI: 1982/83
Direct manip.: 1985

Theoretical accounts of HCI arise

Bush: 1945
Sutherland: 1963
Engelbart: 1968

Newell: 1971
Kay: 1972
Xerox Star: 1981

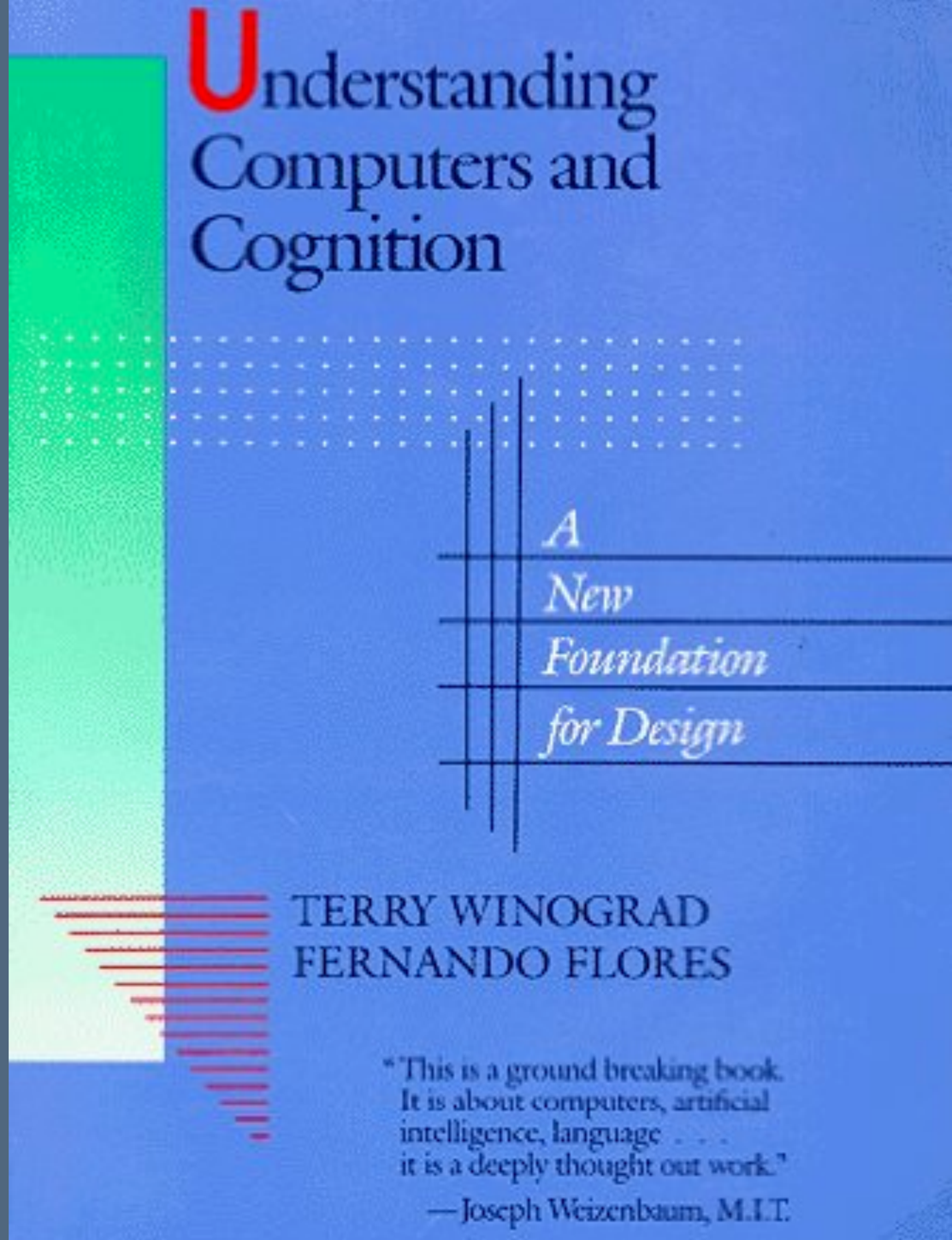
Psych. of HCI: 1983
First CHI: 1982/83
Direct manip.: 1985

Winograd: 1986
Suchman: 1987

Breaks from AI

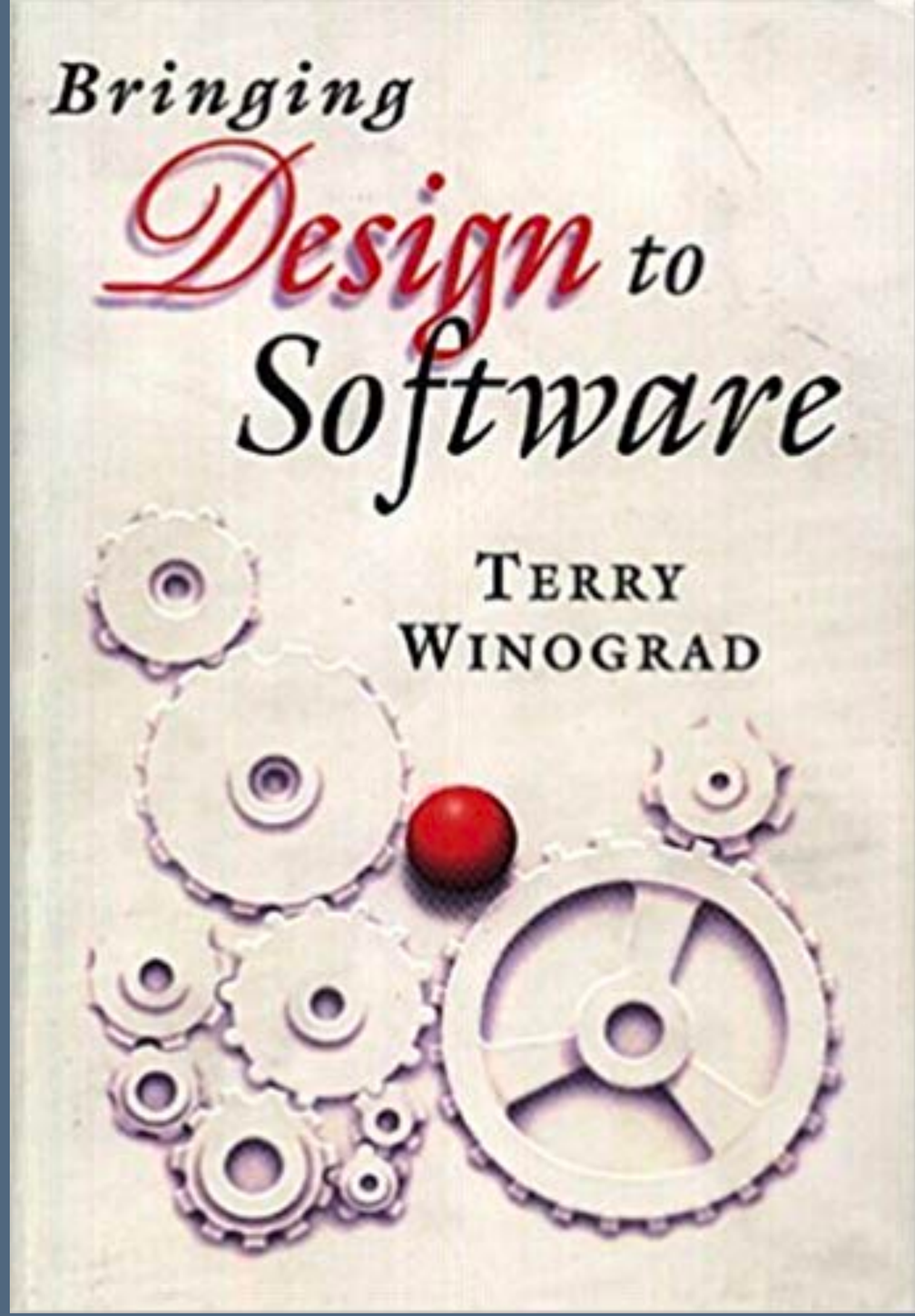
Terry Winograd, an NLP faculty member at Stanford, teams up with philosopher Fernando Flores

The result: a philosophical account drawing on phenomenology to argue that rule-based AI is not a path to success



Breaks from AI

In 1991, Terry founds the Project on People, Computers, and Design, starting HCI at Stanford.

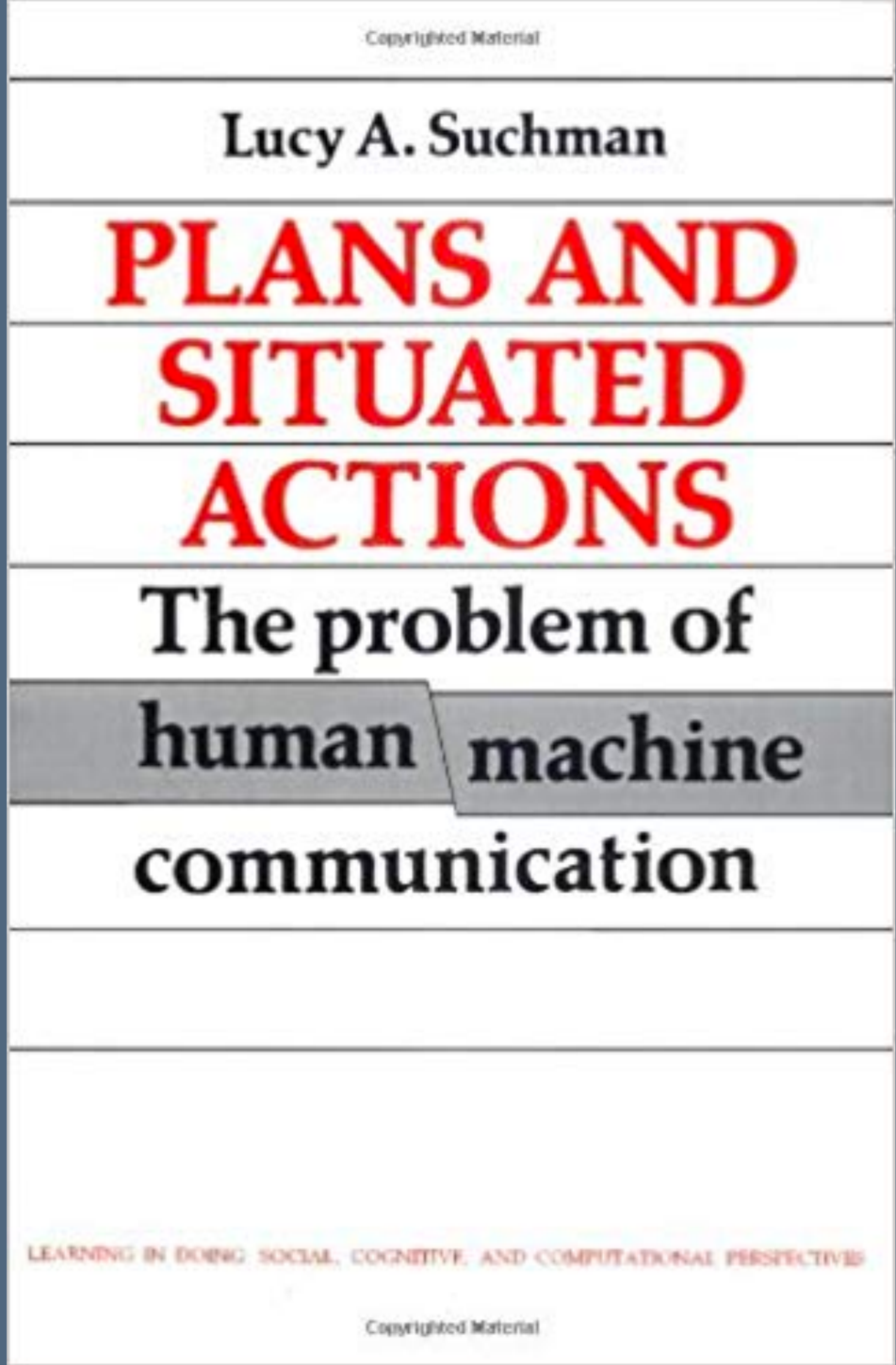


Breaks from AI

Lucy Suchman, an anthropologist at PARC, studies the technologies being developed [1988]

The result: an argument that AIs, which follow **plans**, cannot succeed in complex environments, which require **situated action**

> Anthropological comparison: how people perform wayfinding



The field starts looking familiar to CS 347 students

Bush: 1945
Sutherland: 1963
Engelbart: 1968

Newell: 1971
Kay: 1972
Xerox Star: 1981

Psych. of HCI: 1983
First CHI: 1982/83
Direct manip.: 1985

Winograd: 1986
Suchman: 1987

Design

Design of Everyday Things: 1988

Reflective Practitioner: 1983

Wizard of Oz: 1980

Bush: 1945
Sutherland: 1963
Engelbart: 1968

Newell: 1971
Kay: 1972
Xerox Star: 1981

Psych. of HCI: 1983
First CHI: 1982/83
Direct manip.: 1985

Winograd: 1986
Suchman: 1987

Ubicomp

First UIST: 1988

Computer for the 21st Century: 1991

Bush: 1945
Sutherland: 1963
Engelbart: 1968

Newell: 1971
Kay: 1972
Xerox Star: 1981

Psych. of HCI: 1983
First CHI: 1982/83
Direct manip.: 1985

Winograd: 1986
Suchman: 1987

Social

First CSCW: 1986

Beyond Being There: 1992

Bush: 1945
Sutherland: 1963
Engelbart: 1968

Newell: 1971
Kay: 1972
Xerox Star: 1981

Psych. of HCI: 1983
First CHI: 1982/83
Direct manip.: 1985

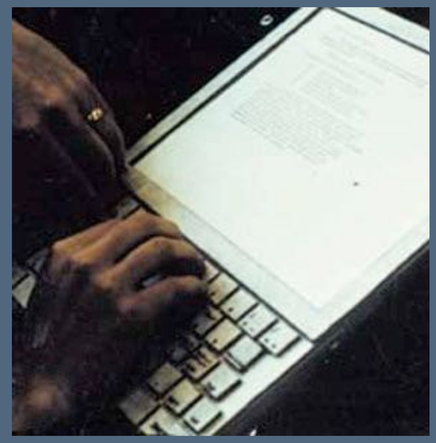
Winograd: 1986
Suchman: 1987

Inheritance of the Memex

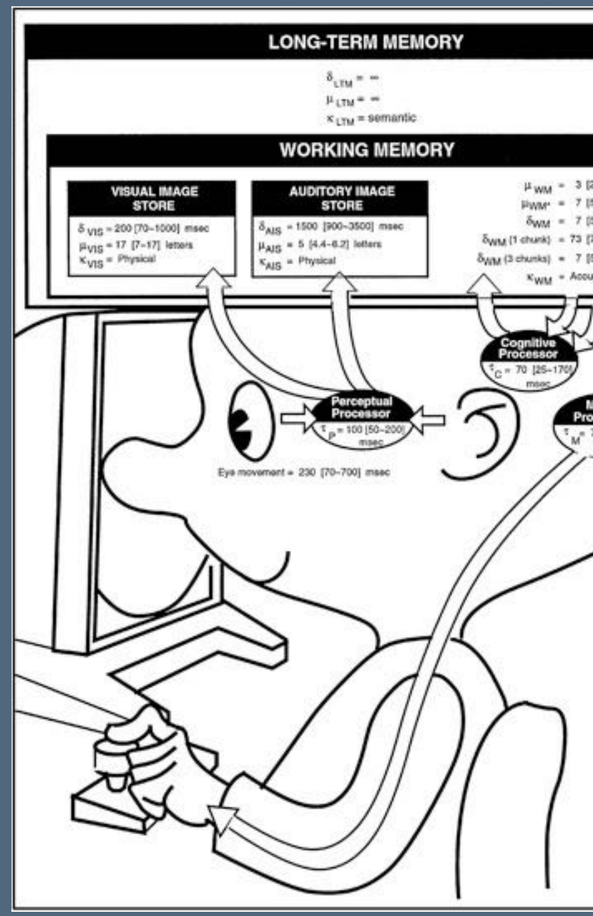
Sketchpad [Sutherland]

NLS [Engelbart]

Dynabook [Kay]



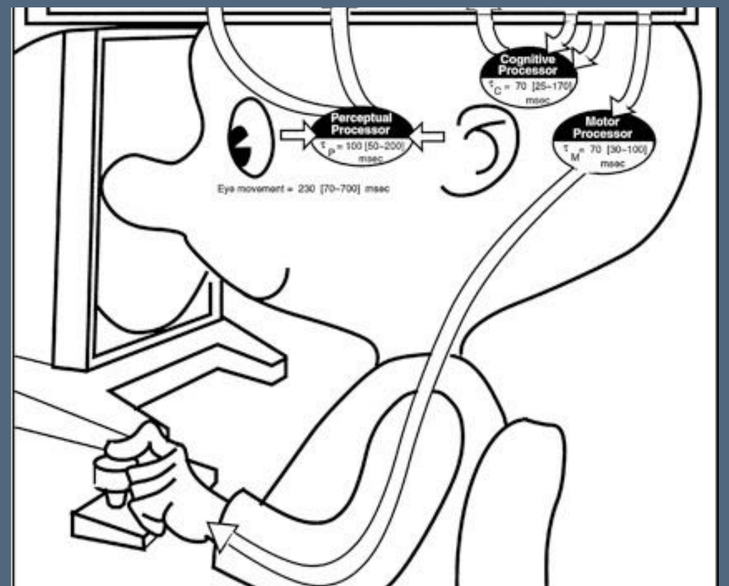
Model Human Processor [Card et al.]



And further… [Bødker 2006]

First wave HCI
80s-90s

Cognitive science
Human factors
Models, pointing

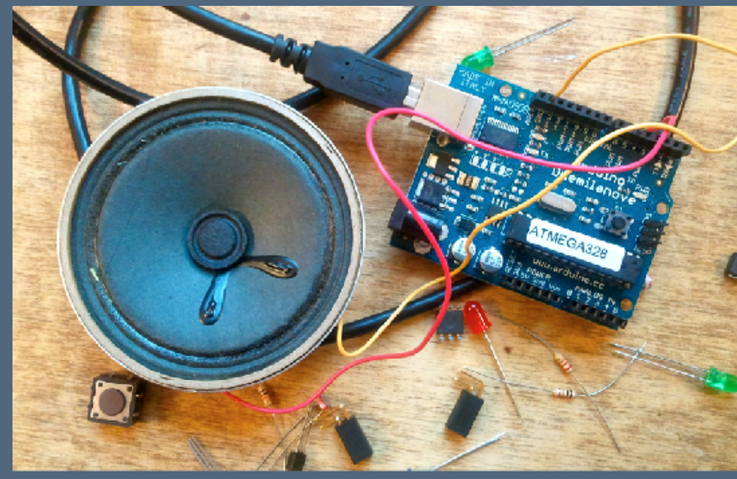


Second wave HCI
90s–00s

Focus on work
Groups of people using
a collection of applications
Ubicomp, CSCW

Third wave HCI
00s-10s

Multiplicity: of use contexts
and application types
Makers, crowds, religion,
assistive, ICT4D, …



And further… [Bødker 2006]

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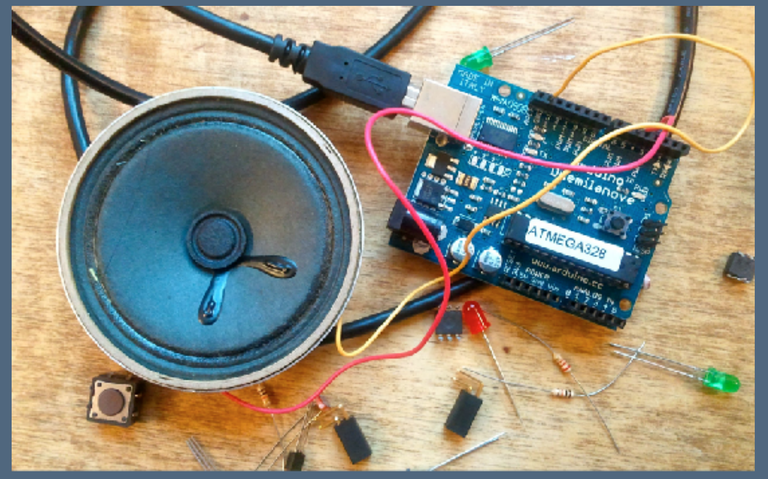

Fourth wave HCI
?

My take: interaction in
society — normative
positions on pro- and
anti-social interaction
contexts that we ought
to empower

Something New

I asked you what you wanted me to discuss. Here are some of the topics…

CS 347: nominate a topic

msb@cs.stanford.edu Switch account

Your email will be recorded when you submit this form

* Required

What's a topic you'd be interested to hear about in the last CS 347 lecture? *

Your answer

Ethics and Dark Patterns

“HCI boogeymen”

Dark Patterns at Scale: Findings from a Crawl of 11K Shopping Websites

ARUNESH MATHUR, Princeton University, USA
GUNES ACAR, Princeton University, USA
MICHAEL J. FRIEDMAN, Princeton University, USA
ELI LUCHERINI, Princeton University, USA
JONATHAN MAYER, Princeton University, USA
MARSHINI CHETTY, University of Chicago, USA
ARVIND NARAYANAN, Princeton University, USA

Dark patterns are user interface design choices that benefit an online service by coercing, steering, or deceiving users into making unintended and potentially harmful decisions. We present automated techniques that enable experts to identify dark patterns on a large set of websites. Using these techniques, we study shopping websites, which often use dark patterns to influence users into making more purchases or disclosing more information than they would otherwise. Analyzing ~53K product pages from ~11K shopping websites, we discover 1,818 dark pattern instances, together representing 15 types and 7 broader categories. We examine these dark patterns for deceptive practices, and find 183 websites that engage in such practices. We also uncover 22 third-party entities that offer dark patterns as a turnkey solution. Finally, we develop a taxonomy of dark pattern characteristics that describes the underlying influence of the dark patterns and their potential harm on user decision-making. Based on our findings, we make recommendations for stakeholders including researchers and regulators to study, mitigate, and minimize the use of these patterns.

CCS Concepts: • **Human-centered computing** → **Empirical studies in HCI**; *HCI theory, concepts and models*; • **Social and professional topics** → **Consumer products policy**; • **Information systems** → *Browsers.*

Additional Key Words and Phrases: Dark Patterns; Consumer Protection; Deceptive Content; Nudging; Manipulation

ACM Reference Format:
Arunesh Mathur, Gunes Acar, Michael J. Friedman, Eli Lucherini, Jonathan Mayer, Marshini Chetty, and Arvind Narayanan. 2019. Dark Patterns at Scale: Findings from a Crawl of 11K Shopping Websites. *Proc. ACM Hum.-Comput. Interact.* 3, CSCW, Article 81 (November 2019), 32 pages. https://doi.org/10.1145/3359183

Category	Type	Description	# Instances	# Websites	Asymmetric?	Covert?	Deceptive?	Hides Info?	Restrictive?	Cognitive Biases
Sneaking	Sneak into Basket	Adding additional products to users' shopping carts without their consent	7	7	○	○	◐	●	○	Default Effect
	Hidden Costs	Revealing previously undisclosed charges to users right before they make a purchase	5	5	○	○	◐	●	○	Sunk Cost Fallacy
	Hidden Subscription	Charging users a recurring fee under the pretense of a one-time fee or a free trial	14	13	○	○	◐	●	○	None
Urgency	Countdown Timer	Indicating to users that a deal or discount will expire using a counting-down timer	393	361	○	◐	◐	○	○	Scarcity Bias
	Limited-time Message	Indicating to users that a deal or sale will expire will expire soon without specifying a deadline	88	84	○	◐	○	●	○	Scarcity Bias
Misdirection	Confirmshaming	Using language and emotion (shame) to steer users away from making a certain choice	169	164	●	○	○	○	○	Framing Effect
	Visual Interference	Using style and visual presentation to steer users to or away from certain choices	25	24	◐	●	◐	○	○	Anchoring & Framing Effect
	Trick Questions	Using confusing language to steer users into making certain choices	9	9	●	●	○	○	○	Default & Framing Effect
	Pressured Selling	Pre-selecting more expensive variations of a product, or pressuring the user to accept the more expensive variations of a product and related products	67	62	◐	◐	○	○	○	Anchoring & Default Effect, Scarcity Bias
Social Proof	Activity Message	Informing the user about the activity on the website (e.g., purchases, views, visits)	313	264	○	◐	◐	○	○	Bandwagon Effect

Michael's current boogeymen

Everyone thinking that chat-based interaction is the future, or should be the default

> I think we're in the MySpace era of AI: the tech is powerful but we haven't figured out how it will transform our lives yet
>
> As a result, I think there's too much of a pull toward learning only the AI modeling—but most people eventually will be working at the app layer, not the infra layer.
>
> And hey, that's an HCI problem!

Michael's current boogeymen

Oversimplified views that either (1) all design/engineering is evil, or (2) we ought to look away from the light and find problems that aren't ethically thorny

> What I find most impressive is when we can integrate the societal and ethical constraints into new design and technical architectures!

RT

Tap

Saving

30 FPS

Digital detoxing

Limiting, Leaving, and (re)Lapsing: An Exploration of Facebook Non-Use Practices and Experiences

Eric P. S. Baumer[1,2], Phil Adams[2], Vera D. Khovanskaya[2], Tony C. Liao[1], Madeline E. Smith[3], Victoria Schwanda Sosik[2], Kaiton Williams[2]

[1]Communication Department, Cornell [2]Information Science Department, Cornell

[3]Technology & Social Behavior, Northwestern

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ABSTRACT

Despite the abundance of research on social networking sites, relatively little research has studied those who choose not to use such sites. This paper presents results from a questionnaire of over 400 Internet users, focusing specifically on Facebook and those users who have left the service. Results show the lack of a clear, binary distinction between use and non-use, that various practices enable diverse ways and degrees of engagement with and disengagement from Facebook. Furthermore, qualitative analysis reveals numerous complex and interrelated motivations and justifications, both for leaving and for maintaining some type of connection. These motivations include: privacy, data misuse, productivity, banality, addiction, and external pressures. These results not only contribute to our understanding of online sociality by examining this under-explored area, but they also build on previous work to help advance how we conceptually account for the sociological processes of non-use.

Author Keywords

Facebook, non-use, technology refusal.

ACM Classification Keywords

site. Changing privacy controls, data ownership policies, and questions about the kinds of social interaction it affords have all contributed to a growing trend of users pointedly leaving Facebook. For example, on May 31, 2010, Quit Facebook Day [19] encouraged users to leave Facebook, listing a number of grievances and providing alternative venues for online socialization. While no Facebook collapse ensued—the site claims just over 40,000 "committed Facebook quitters"—the initiative arguably drew significant attention, both the popular media's and Facebook's, to this growing contingent of Facebook quitters [18].

So why study Facebook refusal as opposed to non-use of any other social technology? Consider, for example, Google's Gmail, which provides web-based email to hundreds of millions of users [6]. Despite its popularity, leaving Gmail does not carry the same significance as leaving Facebook, largely because of the unique social role Facebook plays for so many people—for example, 63% of U.S. adults have an online social networking account and of these, 93% are on Facebook [15]. Email is a platform available from many interoperable providers; if I have a Yahoo or MSN email account, I can still email someone

Understanding Perceptions of Problematic Facebook Use

When People Experience Negative Life Impact and a Lack of Control

Justin Cheng
Facebook
jcheng@fb.com

Moira Burke
Facebook
mburke@fb.com

Elena Goetz Davis
Facebook
elenadavis@fb.com

ABSTRACT

While many people use social network sites to connect with friends and family, some feel that their use is problematic, seriously affecting their sleep, work, or life. Pairing a survey of 20,000 Facebook users measuring perceptions of problematic use with behavioral and demographic data, we examined Facebook activities associated with problematic use as well as the kinds of people most likely to experience it. People who feel their use is problematic are more likely to be younger, male, and going through a major life event such as a breakup. They spend more time on the platform, particularly at night, and spend proportionally more time looking at profiles and less time browsing their News Feeds. They also message their friends more frequently. While they are more likely to respond to notifications, they are also more likely to deactivate their accounts, perhaps in an effort to better manage their time. Further, they are more likely to have seen content about social media or phone addiction. Notably, people reporting problematic use rate the site as more valuable to them, highlighting the complex relationship between technology use and well-being. A better understanding of problematic Facebook use can inform the design of context-appropriate and supportive tools to help people become more in control.

CCS CONCEPTS

• **Human-centered computing** → **Social networking sites**;

ACM Reference Format:
Justin Cheng, Moira Burke, and Elena Goetz Davis. 2019. Understanding Perceptions of Problematic Facebook Use: When People Experience Negative Life Impact and a Lack of Control. In *CHI Conference on Human Factors in Computing Systems Proceedings (CHI 2019), May 4–9, 2019, Glasgow, Scotland UK*. ACM, New York, NY, USA, 13 pages. https://doi.org/10.1145/3290605.3300429

1 INTRODUCTION

Social network sites help people maintain social relationships [17, 31], drive civic engagement and collective action [35, 68], and support entrepreneurship [43]. But while many people derive benefit from online social networks, some feel that their use of such services is problematic. Studies of problematic use of the internet (e.g., [21, 102]) and social networks (e.g., [2, 61, 81]) note symptoms including preoccupation, loss of control, and negative impact on one's relationships, work performance, and life [40].

The present study focuses on perceived problematic Facebook use to understand its prevalence and its relation to different activities on the site, in order to inform design improvements that may reduce problematic use. We define "problematic Facebook use" as reporting a significant negative impact on sleep, relationships, or work or school performance and feeling a lack of control over site use, consistent with broad definitions from the academic literature [72, 81]. We do not use the term "addiction" because there is no agreed-

5 DISCUSSION AND CONCLUSION

Summary. Approximately 3% of Facebook users in the U.S. report feeling like Facebook contributes to problems with their sleep, work, or relationships and that their Facebook use is difficult to control. Understanding their experiences

American Economic Review 2020, 110(3): 629–676
https://doi.org/10.1257/aer.20190658

The Welfare Effects of Social Media[†]

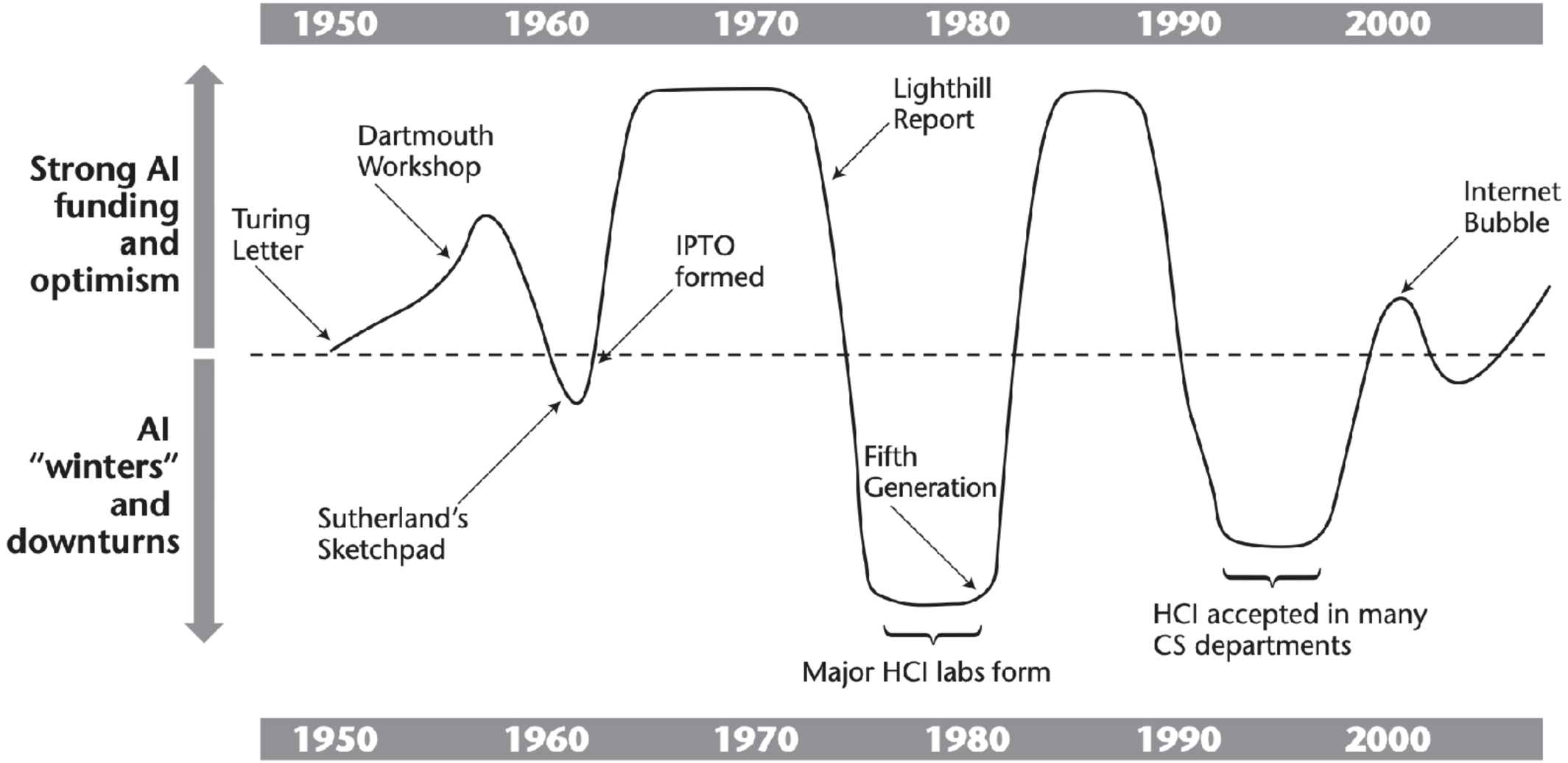
By Hunt Allcott, Luca Braghieri, Sarah Eichmeyer, and Matthew Gentzkow*

The rise of social media has provoked both optimism about potential societal benefits and concern about harms such as addiction, depression, and political polarization. In a randomized experiment, we find that deactivating Facebook for the four weeks before the 2018 US midterm election (i) reduced online activity, while increasing offline activities such as watching TV alone and socializing with family and friends; (ii) reduced both factual news knowledge and political polarization; (iii) increased subjective well-being; and (iv) caused a large persistent reduction in post-experiment Facebook use. Deactivation reduced post-experiment valuations of Facebook, suggesting that traditional metrics may overstate consumer surplus.
(*JEL* D12, D72, D90, I31, L82, L86, Z13)

Social media have had profound impacts on the modern world. Facebook, which remains by far the largest social media company, has 2.3 billion monthly active users worldwide (Facebook 2018). As of 2016, the average user was spending 50 minutes per day on Facebook and its sister platforms Instagram and Messenger

Career trajectories in HCI

Also, "What does HCI look like in the current political and funding landscape?"



Jonathan Grudin, "AI and HCI: Two Fields Divided by a Common Focus". 2009.

Jean Hardy
@jean__hardy

Based on these numbers, if you're a HCI PhD student right now, I think one great way to differentiate yourself in a competitive job market is by NOT studying AI.

> 
> **Daniel Buschek** @DBuschek · Mar 10
> 📢 Looking for current research on #HCI + #AI? Here's a collection of 200+ #CHI2025 preprints, collected via arXiv and your suggestions: medium.com/human-centered...

6:03 AM · Mar 11, 2025 · **1,199** Views

Michael's take right now

I don't think the field is splitting between "AI" and "HCI", or "AI" and "Systems", or "AI" and "theory" — I think the field is executing a collective turn

> Systems, HCI, theory, biocomp, etc. are all reconfiguring themselves based on AI advances

My advice is not "do AI" vs. "do HCI", because AI is going to become as normalized within HCI as the internet is normalized (="boring") within HCI today

> So, instead, look at where the field is going and think ahead 1-2 generations of ideas. What will others solve for you?

Closing

This class

Envisioning and understanding
the future of interaction
between people, society, and technology

This class

Teaches foundational theories
and modern frontiers

This is not like other HCI classes.

Your goal is not just to fashion an alignment between people and technology.

Your goal is to articulate, critique, and generate entirely new ideas about that relationship.

Foundations and frontiers

You will learn the major theories and concepts that underpin HCI

You will engage in critical analyses of these theories and concepts, apply them, and extend them

Big ideas in HCI

Ubiquitous computing

Tangible computing

Ubicomp sensing pipeline

Commodity vs. infrastructure-mediated sensing

Design fixation

Demand characteristics

Gulfs of execution and evaluation

Analogical transfer

Wicked problems

Participatory design

Design patterns

Reflective practitioner

Beyond being there

Grudin's paradox

Distance matters

Socio-technical gap

Crowdsourcing / coordination at scale

The Johansen Matrix

Feminist HCI

AI vs. IA

Direction Manipulation vs. Agents

Mixed Initiative Interaction

End-user programming

Threshold and ceiling

Programming as problem representation

Design principles for visual communication

Encodings, marks, and visual variables

Graphical perception of information

Cognitive models

Embodied cognition

HCI methodological plurality

Ability-based design

ICT4D

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