Some Advice to Budding Researchers

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Logic Mentoring Workshop
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How Should You Listen to Such a Talk?

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- *Perhaps make a note and revisit later . . .*

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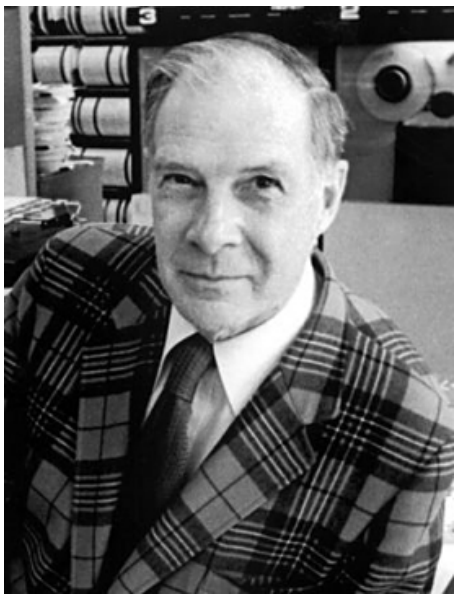

Richard Hamming

``You and Your Research''

Transcription of the
Bell Communications Research Colloquium Seminar
7 March 1986

J. F. Kaiser
Bell Communications Research
445 South Street
Morristown, NJ 07962-1910
jfk@bellcore.com

Credit Also to Manuel Blum

MANUEL BLUM

Advice to a Beginning Graduate Student
or
What is Research?
or
The 4 R's of Graduate School:
Reading, Rithmetic, Research, and Writing

Books Are Not Scrolls!

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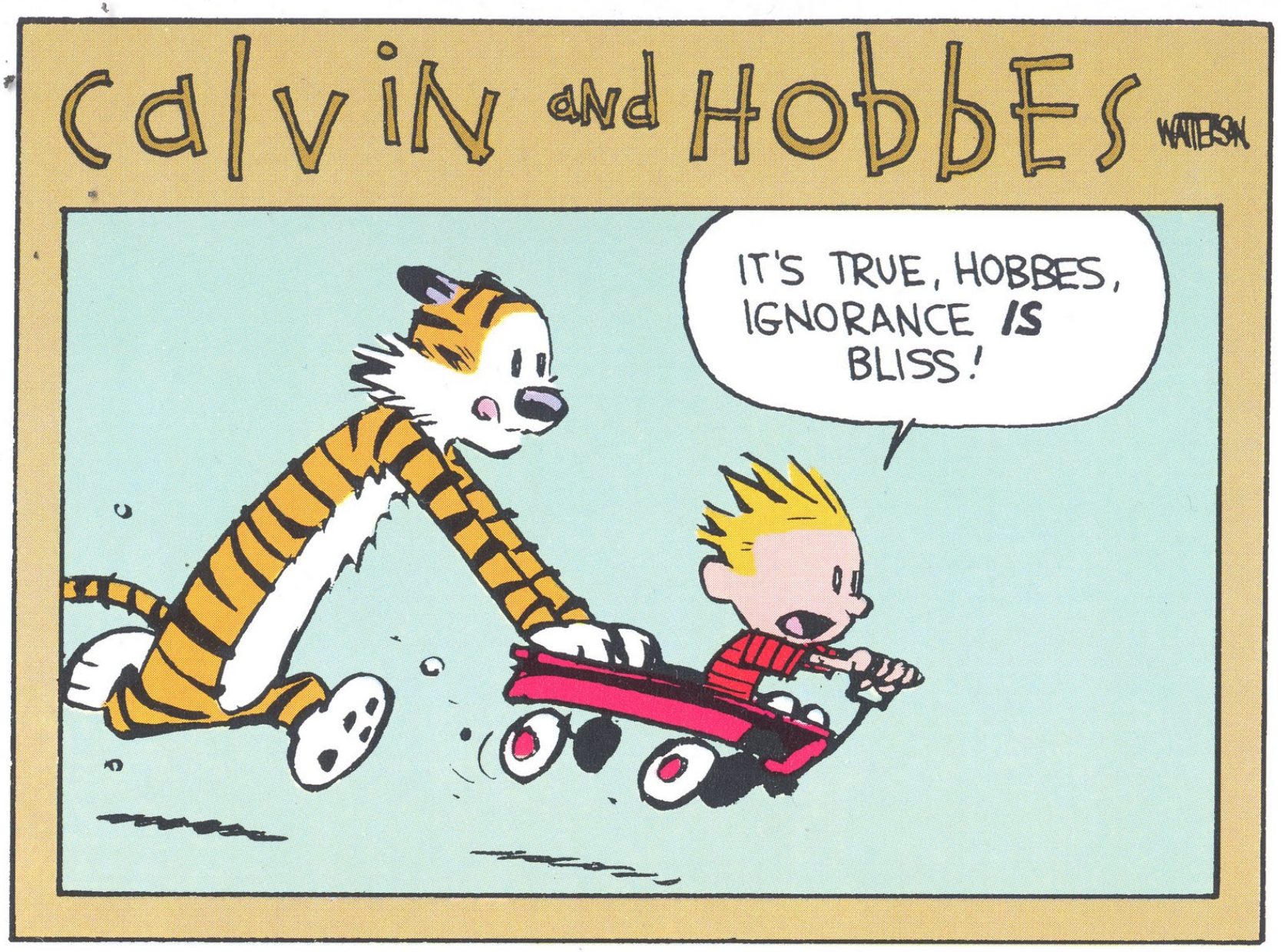
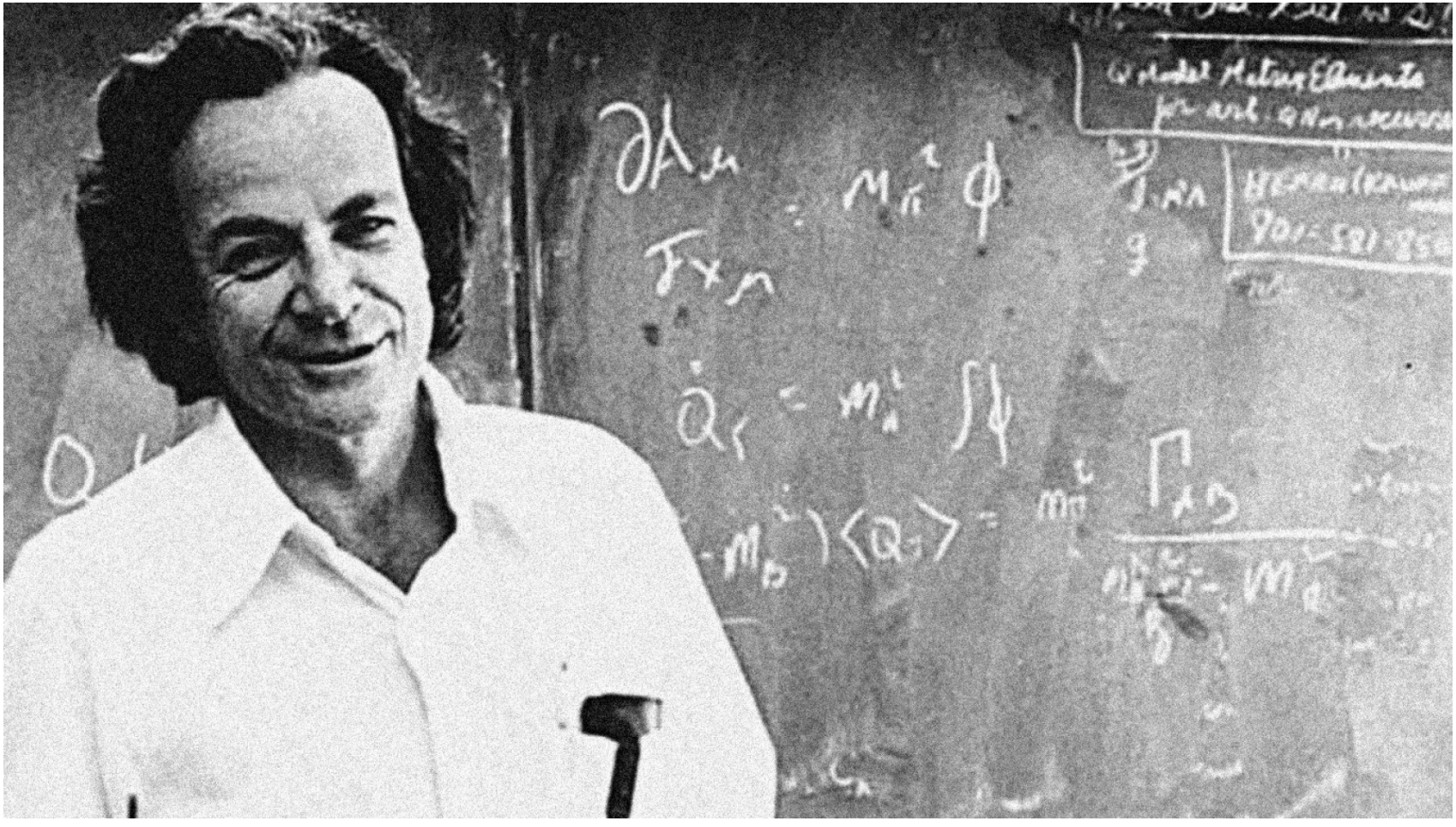
Ignorance Can be an Asset



The Feynman Method



The Feynman Method Meets Timed Automata

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Let A and B be timed automata and $T \in \mathbb{N}$ some time bound.

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Let A and B be timed automata and $T \in \mathbb{N}$ some time bound.

Is "$L(A)\restriction_T \subseteq L(B)\restriction_T$?" decidable??

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This led us to the development of alternating timed automata, the decidability of Metric Temporal Logic and related formalisms, etc. etc. — but the original time-bounded problem remained elusive!

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Until ...

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I met Alex Rabinovich at FORMATS 2008 . . .

The Feynman Method Meets Timed Automata

Time-Bounded Verification*

Joël Ouaknine[1], Alexander Rabinovich[2], and James Worrell[1]

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Abstract. We study the decidability and complexity of verification problems for timed automata over time intervals of fixed, bounded length. One of our main results is that time-bounded language inclusion for timed automata is 2EXPSPACE-complete. We also investigate the satisfiability and model-checking problems for Metric Temporal Logic (MTL), as well as monadic first- and second-order logics over the reals with order and the $+1$ function ($\mathsf{FO}(<,+1)$ and $\mathsf{MSO}(<,+1)$ respectively). We show that, over bounded time intervals, MTL satisfiability and model checking are EXPSPACE-complete, whereas these problems are decidable but non-elementary for the predicate logics. Nevertheless, we show that MTL and $\mathsf{FO}(<,+1)$ are equally expressive over bounded intervals, which can be viewed as an extension of Kamp's well-known theorem to metric logics.
It is worth recalling that, over unbounded time intervals, the various problems listed above are all undecidable.

I met Alex Rabinovich at FORMATS 2008 . . .

and we published at CONCUR 2009!

Embrace Discomfort & Play to Your Strengths

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"Somewhere around every seven years make a significant, if not complete, shift in your field."

Richard Hamming

Seek Collaborations with People Smarter than Yourself

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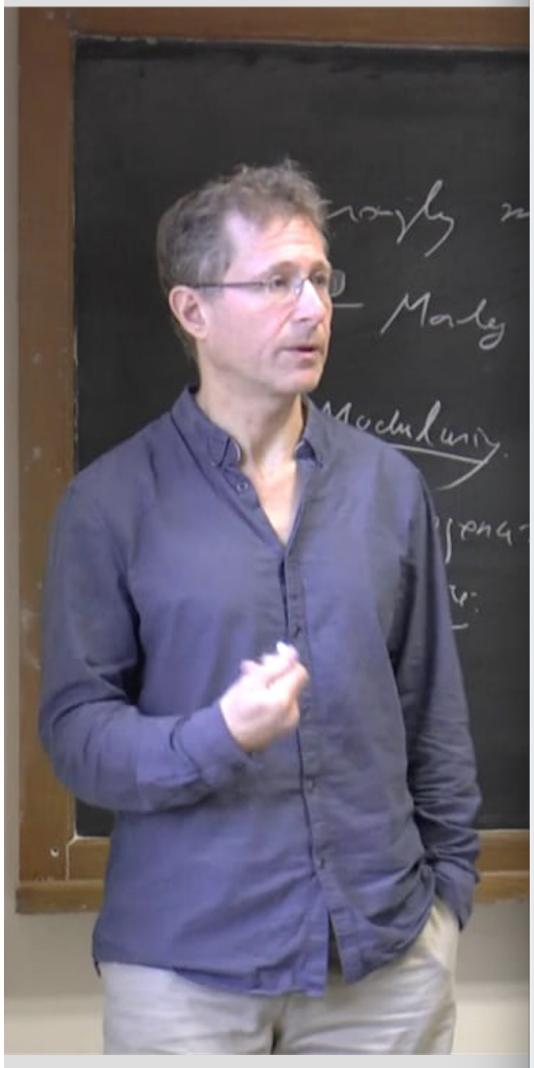

Finally . . . Be Curious, and Above All Enjoy Yourself!

One Last Word: Problem Selection

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