ICSI: a personal retrospective

- ICSI as a whole: some major accomplishments
- The Realization Group: looking backward
- ICSI: A place for us

Sally UCB Bending file

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1	1	WORKSTATION 600-2024-01 MDL: 3/60C-8 Ser.#737F2419		9,983.00
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ICSI Accomplishments (in brief)

- Staying alive: through trials and tribulations
  - 10 years of primary intl support
  - 3 years of primary industrial support
  - 7 years of winging it
  - > $120M all together over the years
- Maintaining great staff, high standards
- >1000 staff and visitors, including many trainees and collaborators
- Alumni moving on to great positions
- Thousands of publications, many awards
- Specific research accomplishments

AI Group Accomplishments (in brief)

- Massively parallel processing
  - Sather – OO language, ideas&people -> impact on Java
  - pSather – impact on Google and Vmware
- Neural modeling, language, learning
  - dynamic models of action, adopted in Semantic Web
  - FrameNet – widely used resource on semantic structure
- Cognitive science
  - Human color processing and language
  - Detailed models of child language learning
- Berkeley Center for the Information Society
  - Teaming w/ social scientists, -> CITRIS
  - BFOIT

Algorithms Group Accomplishments (in brief)

- Seminal theoretical work
  - Computational complexity, e.g., for reals
  - Online algorithms
  - Randomized algorithms
- Development of Tornado codes (digital fountain)
- Distributed hash tables (with Networking group)
- Algorithms for genomic analysis
  - Fast haplotype determination
  - Disease association studies
- Karp awards (most recently, Kyoto)

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Networking Group Accomplishments (in brief)

- First decade (Ferrari/Tenet years)
  - 1st provable performance guarantees for real-time traffic
  - Design and implementation of real-time protocol suites
- Second decade (ACIRI -> ICIR years)
  - the eXtensible Open Router Platform (XORP), an innovative and robust open-source routing platform
  - Distributed hash tables (with Algorithms)
  - Widely used intrusion detection system
  - Seminal work on architecture and Congestion control
  - Major community involvement (RFCs etc)
  - Many awards (Sigcomm, IEEE Internet, Grace Murray Hopper, Internet Test of Time)

Realization/Speech Group Accomplishments (in brief)

- Computational Systems
  - Ring Array Processor (RAP machine)
  - Torrent – 1st single chip vector microprocessor
- Speech recognition methods
  - Connectionist hybrid HMM/MLP
  - RelAtive SpecTral Analysis (RASTA) – improving speech recognition in millions of cell phones
- BErkeley Restaurant Project (BERP)
- More recent impactful methods
  - Segmentation (speaker, sentence)
  - Speaker recognition with conversational keywords
  - Speech understanding (e.g., summarization)
  - Multistream discriminant speech recognition

Realization Group, 1988-1998

- Precursor to the current Speech Group
- Speech processing the key application, but the focus was mostly on HW, SW, neural networks
- 10 PhD students graduated, many visitors
- Two main systems: RAP and SPERT
- Two major speech directions: neural networks and feature extraction (for speech recognition)
- Some sights and sounds from this period

Three "wise" primates

The hair was black, but the mess was the same

Chuck Wooters: student #1

James Beck, "Ace" hardware guy

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Hervé and Morgan with the RAP

Hervé in a bit of trouble in Belgium …

RAP Users Group (RUG)

CNS and SPERT

- Connectionist Network Simulator
  - Realization, AI, and campus folk
  - Paper design of large machine
  - Real design of chip (T-zero), board (Spert), and multi-board (tetra-Spert)
- T-zero ("Torrent"): 1st single-chip vector uP
- Like the RAP, Spert was actually used for speech research (by us, others)

CNS research group

Krste realizes that vectors are like bananas

Brian, Krste, and a Torrent wafer

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Oh, yeah, I suppose we need software

And there was a song

Well, we gotta compute, and we gotta write code
And we want to read in, and we gotta "unload"
Want a cost that don't hurt, so we built us the Spert

Got a mean vector unit, to do that fixed point fast
Use that MIPS assembler, to make our efforts last
Don't wanna lose our shirt, so we built us the Spert

You know fast multipliers are OK in their place
And those RISC CPUs start to pick up the pace
All alone they're inert, put together they're Spert

We love those neural networks, we love to train 'em up strong
We like to run 'em forward, we prop 'em back
(but not too long)
We like to keep 'em alert, so we built us the Spert

Multi-talented Jeff Bilmes

Jeff eats watermelon – '95

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Jeff eats watermelon – '96

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Jeff eats watermelon – '97

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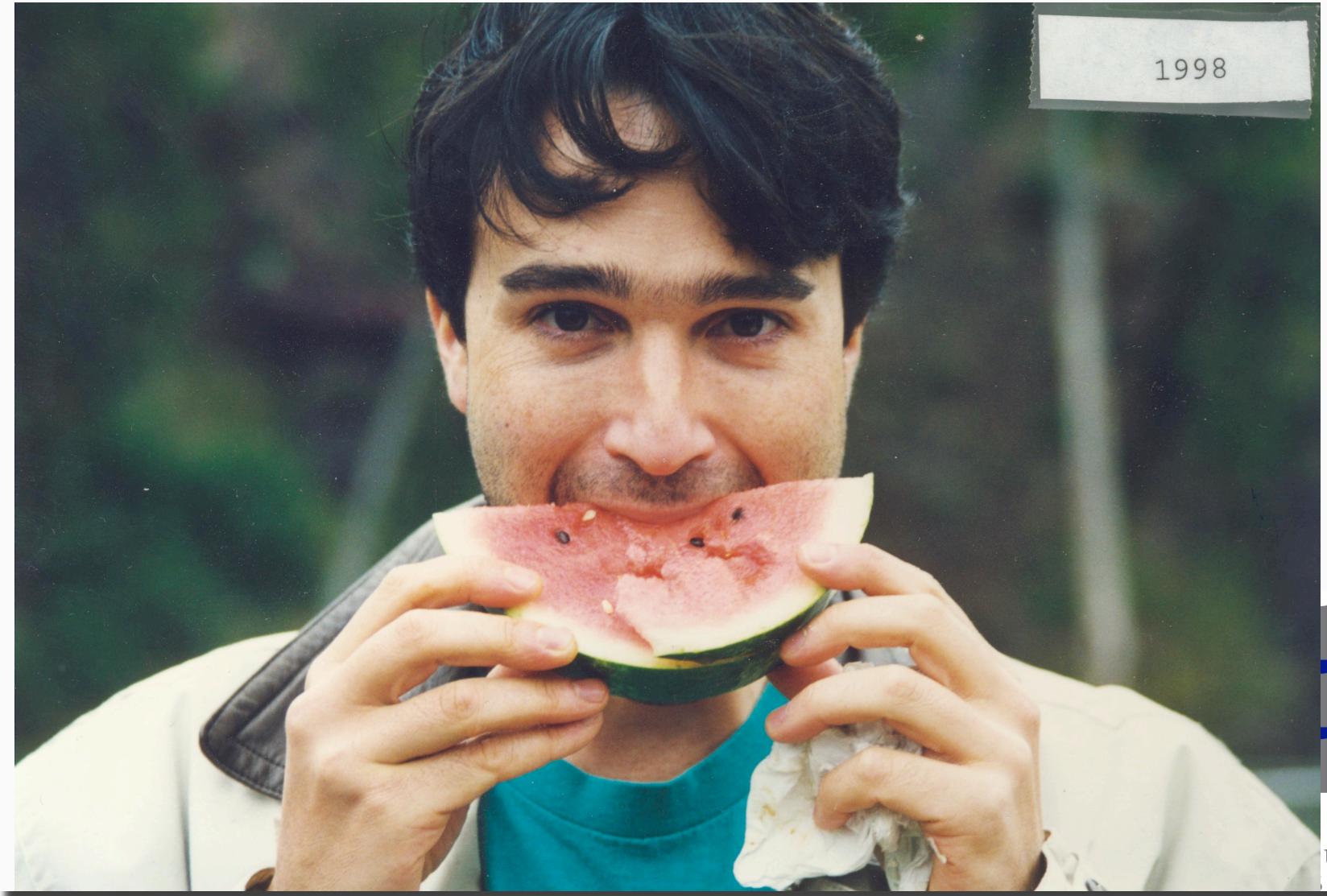
Jeff eats watermelon – '98



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Not homeless – just Nikki

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Dan Ellis

Mike Shire, hard at work

Eric Fosler-Lussier, working equally hard

Realization Group, ~1998

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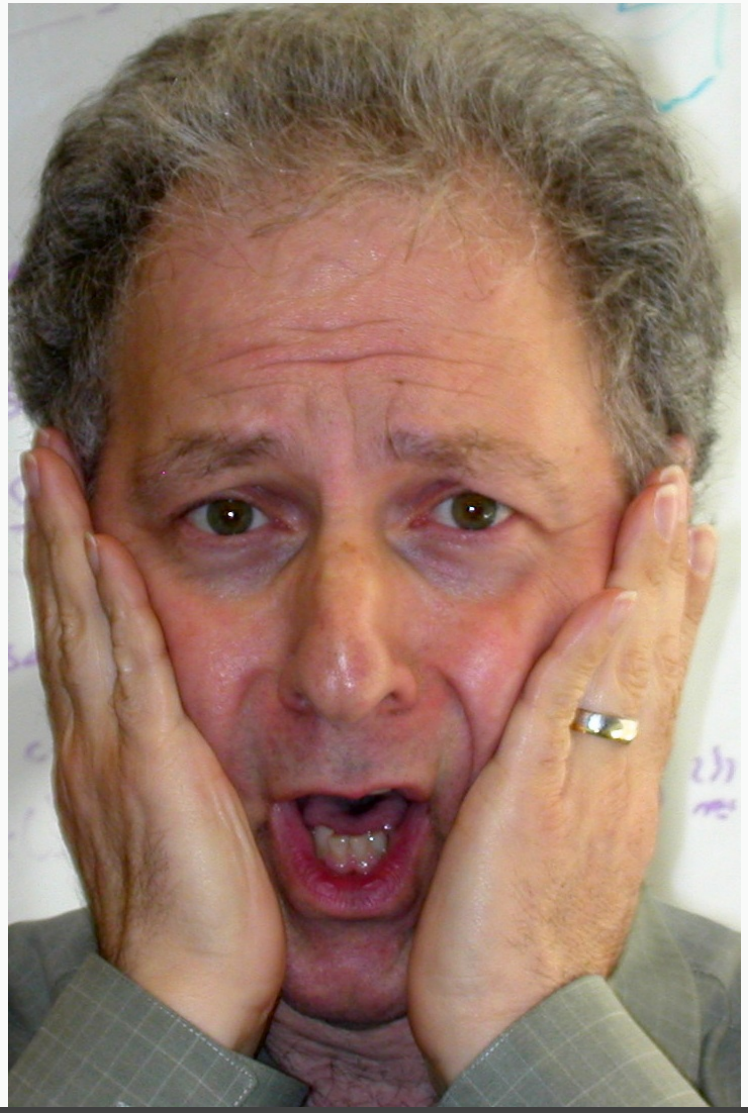
Personal perspectives: 1998-1999

- Era of dominant international funding was ending
- Was ICSI a project, or an institution?
- After a bit of chaos, Board asked me to be the Director
- Then I looked at the financials

First reaction



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1999: Handling the transition

- Discussions with international sponsors to soften the change
- Looking for new Federal sources
- Eliminating noncritical spending
- But most of all, having the good fortune to have some major help: Scott Shenker and the ACIRI crew rejuvenating Networking, bringing in industrial funding (primarily AT&T and Intel)

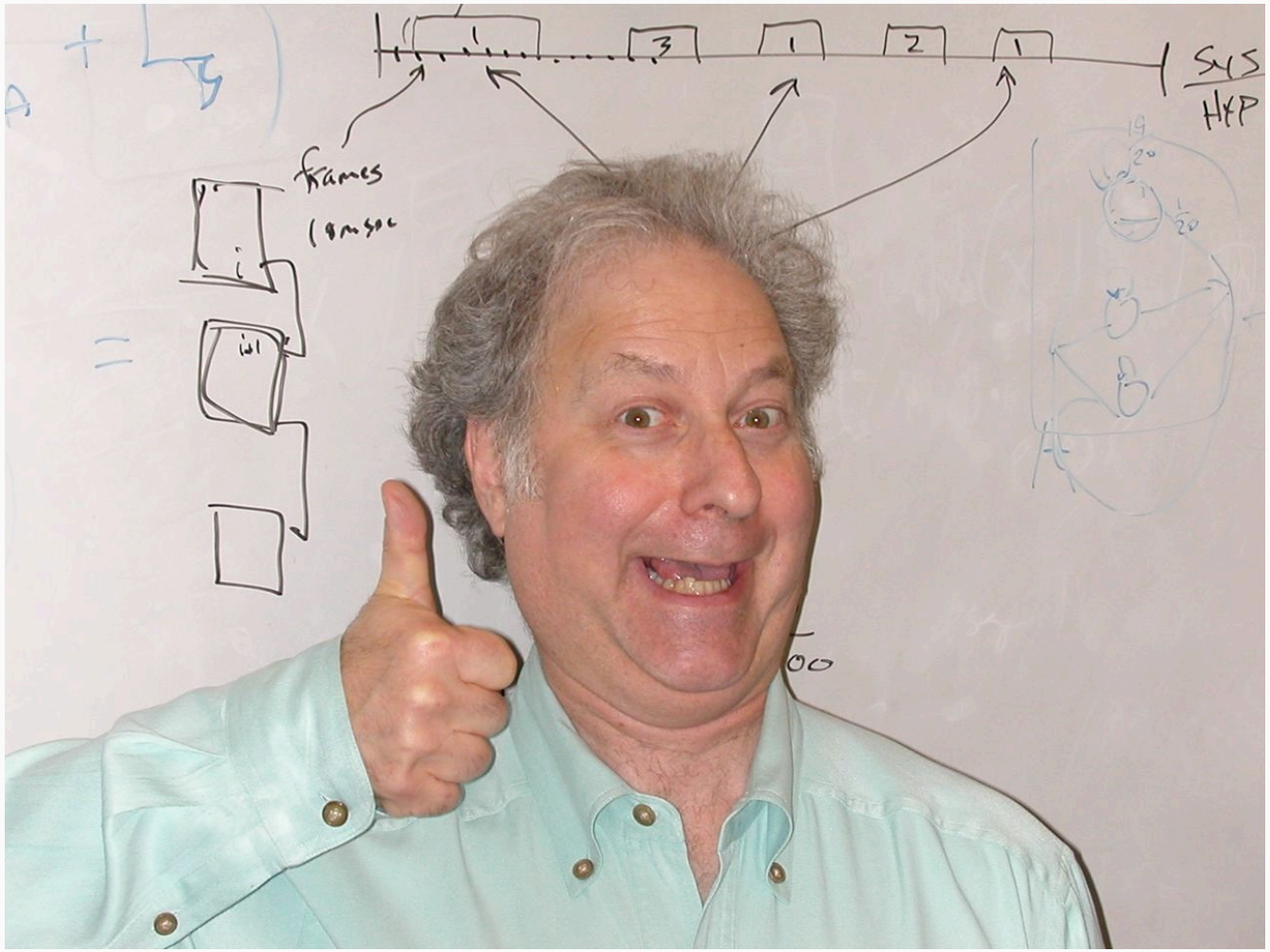
The only constant is change

- After a few years of boom, the bust hit
- Industrial funding sharply decreased
- Researchers submitted many proposals
- Many were successful
- By 2003, main support was US Federal
- But industry and international programs also continued (at lower levels)
- Currently, international program expanding again (especially Germany)

Group changes

- Realization -> Speech
  - Speech changing from ASR only to ASR+SRE+ASU+ …
- Theory -> Algorithms
  - Greater emphasis on application areas
- Networking->ACIRI->ICIR->Networking
  - Security/worms now a greater portion
- AI Applications -> AI
  - Larger emphasis on social applications
- New group: Architecture
  - Realization redux: MIT émigré Krste Asanovic
- New group: Vision
  - Quickly ramping up: MIT émigré Trevor Darrell

Current prospects



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The years ahead

- Keeping this going requires constant effort
- But it can work, as it has
- The key: outstanding people
- A special place for special people
- Deserving of a song …

ICSI (A Place For Us)

[with Apologies to S. Sondheim and L. Bernstein]

Here's a place for us; ICSI, a place for us
PIs handled with loving care that's not found elsewhere

Now's a time for us; today, a time for us
International research spot; part of Berkeley and yet it's not

ICSI! ICSI!

We'll always keep on inventing
Long as the sponsor's consenting

ICSI

Here's a place for us; a time and place for us
Place your bets on us if you dare
We'll charge overhead everywhere

ICSI! ICSI! ICSI!

Acknowledgments

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- The research staff for being at the top of their game
- ICSI's Board and sponsors for their support