

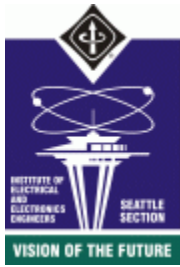
Plan for a Successful Engineering Career

Joe Decuir, Fellow



IEEE Seattle Section
UW Bothell EE faculty

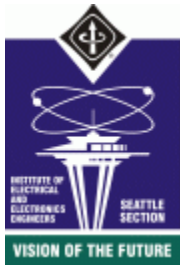
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Agenda

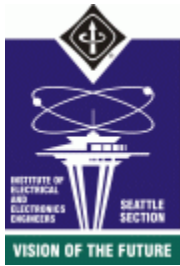
- Essential: Basic career advice
- Optional: Mentorship Q&A - illustrations
- Other Resources





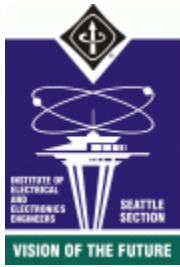
Basic Advice for Engineers

1. You manage yourself
2. Learn to educate and re-educate yourself
3. AI Literacy
4. Learn to work in teams
5. Learn essential relationship skills
6. Find jobs that help your career goals
7. Leverage professional societies
8. Learn to manage your time



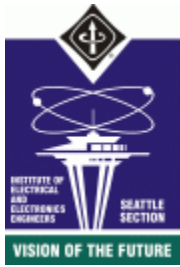
1 - Manage Yourself

- Engineers are professionals. You will all be expected to be self-starters.
- Even if you have no subordinates, you manage your own time and effort.
- You will negotiate your goals and objectives with your management.
- As you advance, and have subordinates, you will negotiate their goals and objectives.
- Suggestion: where possible, manage two levels up - connect to your boss' boss, too.



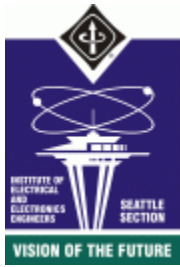
2 - *Re-educate yourself*

- Our industry changes fast: Examples:
 - 1947: transistors; 1971: microprocessors
 - 1990: mobile phones; 1994: modern internet
 - 2026: 8 core notebook PCs, quad-core phones, multi-core game consoles, 5G mobile service
 - Happening: AI tool (e.g. ChatGPT, CoPilot); wearable technology; Internet of Things; ubiquitous surveillance devices (e.g. Pegasus); voice controls; applications of blockchain for security; etc
- It is possible that most of your career work will be in fields that don't exist yet.



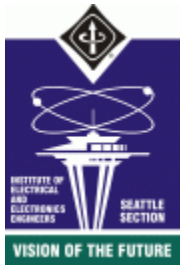
3 - *AI Literacy*

- “Artificial Intelligence”, implemented in Large Language Models (LLM), is everywhere now
 - Opportunity and danger
- New tools: Microsoft CoPilot, Google Gemini, Anthropic Claude, Open AI ChatGPT, etc
- Opportunities:
 - Analyzing very large data sets
 - Assisting design: software & hardware, biochemistry
- Dangers:
 - Hallucination, plausible but inaccurate responses
 - Amplifying lies and disinformation
 - Creating bait for cybersecurity hackers



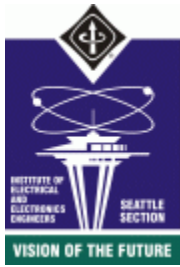
4 - *Teamwork*

- Successful products are rarely the work of a single person
 - Prototypes != products.
- Products need teams: chains that begin with suppliers, go through the factories, and end with customers, including sales and support.
- Successful engineers work with all parts of the chain, not just within engineering.
- If you cannot work with these people outside engineering, someone else will have to represent you to them.



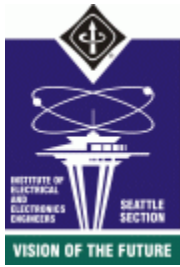
5 - Relationship skills

- ALL of those teams are made up of people connected by relationships.
- Critical relationship skills:
 - **Listen**, to understand (not just waiting to speak)
 - **Speak** clearly, concisely, articulately
 - good diction, don't mumble, small number of points
 - Read and write **non-fiction**: email, specs, plans, reports, etc
- This is why we ran IEEE Student paper contests
 - Engineers who can give presentations well, including good Q&A, have a better chance of controlling their careers.



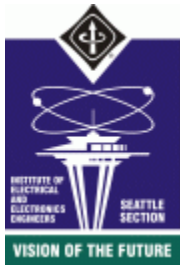
6 - *Job selection criteria*

1. Choose jobs that will teach you a lot
 - No University can afford enough equipment for you to make the mistakes...
2. Choose jobs that network you in your industry
3. Choose jobs (if they are businesses) that have good real marketing
 - If they don't, they will eventually fail
4. Choose jobs in quality-oriented companies
 - More fun than financially driven companies
 - See next slide for quality engineering details



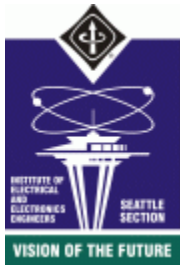
Aside: engineering quality

- I spent 42 years in industry
- I summarize engineering quality:
 1. Maintainable Theory of Operation
 - Document the design & tradeoffs
 2. Adequate Quality Assurance Testing
 - Prove the prototype works well enough
 3. Sufficient Quality Control Testing
 - Prove each manufactured unit works
 4. Support end users: tech support, etc



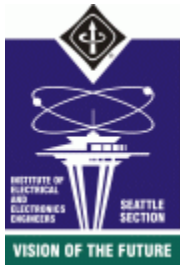
7 - Professional Societies

- Good source of ongoing education
 - Retrain yourself to stay current
 - Retrain to learn about a new field
 - Journals & on-line publications (Xplore)
 - Conferences, chapter meetings, webinars
- Great way to network - so you can hire or be hired out of your network
 - Inside your current specialty but outside your company
 - In your area but outside your specialty



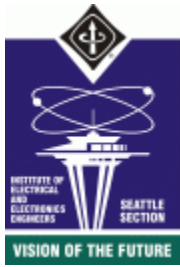
8 - *Time: life & tasks*

	Urgent	Not urgent
Important	Gets done	<u>Gets</u> <u>neglected</u>
Not important	<u>Distractions:</u> <u>displaces</u> <u>important but</u> <u>non-urgent items</u>	Gets neglected



Time management

1. Make sure you stop and meditate on what is important, particularly over the long term, not just the short term.
2. Get data: sample your existing life to see where you spend your time now.
3. Distinguish those important things from unimportant things that consume your time.
4. Allocate time for those things that are important but not urgent.
5. Plan: break big items into small pieces and schedule these smaller pieces.



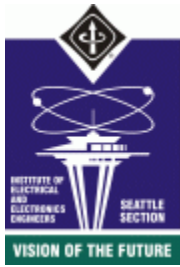
Good Books

- Corporate Confidential, Cynthia Shapiro
 - General advice about modern corporations and careers
- What Does Somebody have to do to get a Job Around here? Cynthia Shapiro
- Mythical Man-Month, Fred Brooks
 - Essays on (software) engineering management
- The Engineer in Transition to Management
 - IEEE Press, Irwin Gray
- Engineering philosophy = anything by Henry Petroski
 - Favorite: Invention by Design
- Patent it Yourself, David Pressman
- Seven Habits of Effective People, Steven Covey
- Crucial Conversations, Patterson et al

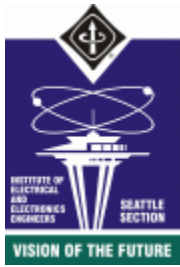
Questions?



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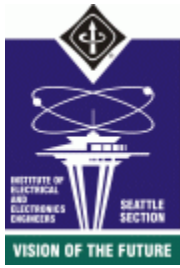


COMMON MENTORSHIP QUESTIONS - ILLUSTRATIONS



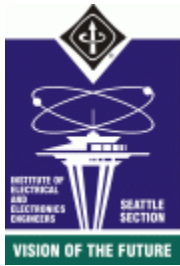
List of Mentorship Questions

1. What advice would you have for engineering students?
2. Career highlights
3. Career lowlights
4. What type of engineering degree do you have?
5. Engineering work history
6. What type of engineering work do you currently do?
7. What are some highlights of your activities over the past 12 months?
8. What is your typical day like?
9. How important is an advanced engineering degree? (MS or Ph.D.)
10. Do I need to get a business degree like an MBA in the future?
11. How important is Professional Registration for engineers? What are the main steps leading up to becoming a P.E.?
12. Should I get involved in professional societies?



1 - What advice do you have for engineering students?

- See above



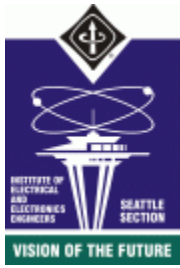
2 -Career Highlights

Shipping products:

- Atari 2600 home video game console, 30M units, still for sale
- Atari 800-family personal computer system, 6M units, serial bus
- Amiga 1000 system , 1st multimedia PC, 5M units, 1st GPU
- Evercom 12 (1st half-card PC modem) paving Internet
- Everfax 24/96 (1st PC FAX-modem)
- Windows 95 (internet appliance, with PC FAX)
- Windows 2000 (modems, cell phones, networking)

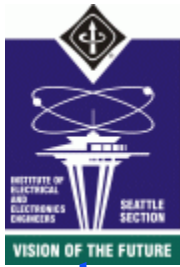
Completing useful standards:

- Data modems: ITU V.32bis (14.4k), V.34 (33.6k) & V.90 (56k)
- Fax modems: ITU T.31 & T.32
- 2G digital cellular data: GSM 7.07, TIA IS-99 & IS-135
- USB: Communication Class Driver, mobile data tethering
- Ultra Wideband radios: WiMedia/Ecma-368
- Inventing the next generation of Bluetooth®: 3.0, 4.0 - 4.2
- Wi-Fi Direct, based on Bluetooth Transport Discovery Service
- DC Microgrids for the developing world: IEEE P2030.10



Living Computer Museum (2019)





3 - *Career Lowlights*

Inept management: poor marketing and/or poor execution leads to poor business, and layoffs:

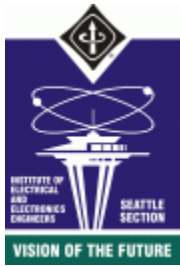
- 1st one (at 20) was scary
- 2nd one (at 25) led to Atari
- 3rd one (at 42) led to Microsoft
- 4th one (at 65) needed sabbatical, 10th year at UW

Intra-company politics:

- Competing with colleagues for review rewards, and other resources, interferes with team spirit

Bad reviews after management changes:

- The new management may have radically different performance objectives than the previous management that you had been pleasing...



4a - Engineering Education

BSEE from UC Berkeley, 1972 (minor in Premed)

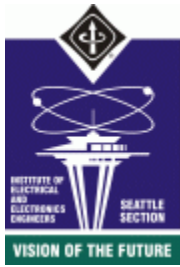
MS in biomedical engineering at UC Berkeley, 1973

Started on a PhD at UC Berkeley in 1979

- Dropped out in 1981 to sustain a company I co-founded

I have been reading journals and going to conferences frequently since then:

- Distinguished Lecturer in Consumer Electronics Society
- International Conference on Ultra Wideband in 2009
- Wireless Workshops in 2002 and in 2009
- Global Humanitarian Technology Conference in 2011 - 2019
- International Conference on Consumer Electronics 2013 - 2017
- Sustainable Technologies (www.sustech.org) 2013 - 2017
- AI Summit at UW Bothell, 2024 & 2025



4b - Advanced Degrees

I got a master's degree right away

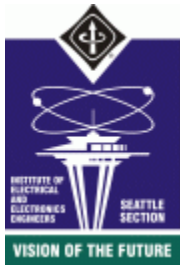
- I was just hitting stride as an engineer as a senior; the Masters degree (at the same school) extended that
- MS work lead directly to success in the first three jobs

I started on a PhD after working for several years

- It was too much to be an entrepreneur AND a grad student
- My PhD advisors told me that if I had a successful company, a PhD was a waste of time (next slide)

I earned my teaching credential as an IEEE Fellow

- For contributions to video games and personal computer graphics (see portfolio slides above)
- UW EE dept thinks that IEEE Fellows are at least as valuable as a PhD.



4c - *Left PhD program*



Carlo Sequin told me to quit school, make money and give them some. I did.

I was Dr Ed Lee's "Angel Investor", with \$250k in the late 1980s.





5 - Engineering jobs

Medical lab instruments, summer 1970

Medical research for intensive care, 1974-1975

Atari: video games & personal computers, 1975-1979

Standard Technologies: telecom, 1979-1982

Amiga: multimedia personal computers, 1982-1984

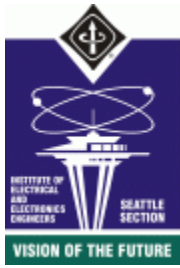
Everex: modems & PCs, management, 1985-1992

Microsoft: PC networking, 1992-2000

MCCI: mobile phone connectivity, 2002-2007

Cambridge Silicon Radio: Bluetooth and other wireless chips, 2007-2015

EE teaching Faculty, UW Bothell: 2016-present



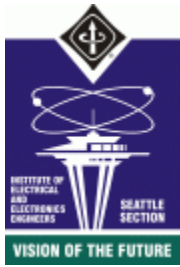
6a - Current Engineering Work, Last regular job

Three areas:

1. Develop public engineering standards (below)
2. Support related product development (CSR ICs)
3. Industry relations

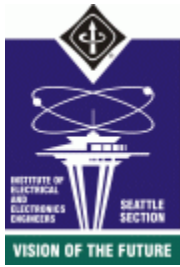
Last job, public standards work:

- Bluetooth Low Energy - new applications
- Connecting BLE to the internet
- Internet of Things
- Wireless charging
- Organize testing for the above



6b - Current Engineering Work

- Teach general lab courses: transistors and circuits, digital logic, Verilog, microprocessors.
- Teach senior project (Capstone) classes
 - Over 150 students in 9 years
- Contributed to a new public standard for DC Microgrids: IEEE 2030.10-2021
- Continue in IEEE, in Seattle Section, Region 6 and in humanitarian conferences.
- Complete an MIT Press Platform Series book on the Atari computer systems



7a - Work Highlights

Inventing new product technologies

- Changing the world

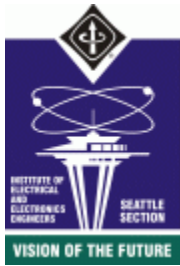
Seeing those products used by happy customers

- Meeting happy customers in public

Working with other engineers

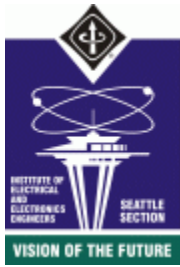
- Business is a team sport

Helping my friends find new jobs



7b - Work Highlights

- I pay it forward, training the next generation of engineers how to earn a living while I still remember what to tell them.
 - I train students I would like to hire
 - Joke: students are smarter than I am, but I have forgotten more than they have learned so far
- I get to learn new things myself:
 - FPGA (Field Programmable Gate Arrays)
 - DSP (Digital Signal Processors)
 - New languages & tools: RV32 CPU, Python, AI tools
- Students prototyped Microgrid standard
- Students are helping to finish my book



8a - Typical Work Day, at last industry job (2015)

Work from home office:

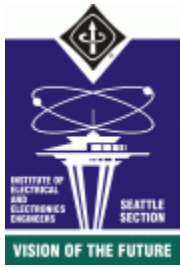
- Technical conference calls, mostly in the mornings (PT).
 - 12 hours/week typical
- Document drafting & editing
- Prepare presentations for those calls and meetings
- Testing products
- Visit other companies

Standards meetings (travel): >120 days/year

- Run meetings with engineers from many companies
- Introduce and discuss contributions
- Try to achieve consensus for subsequent work

Test events (travel)

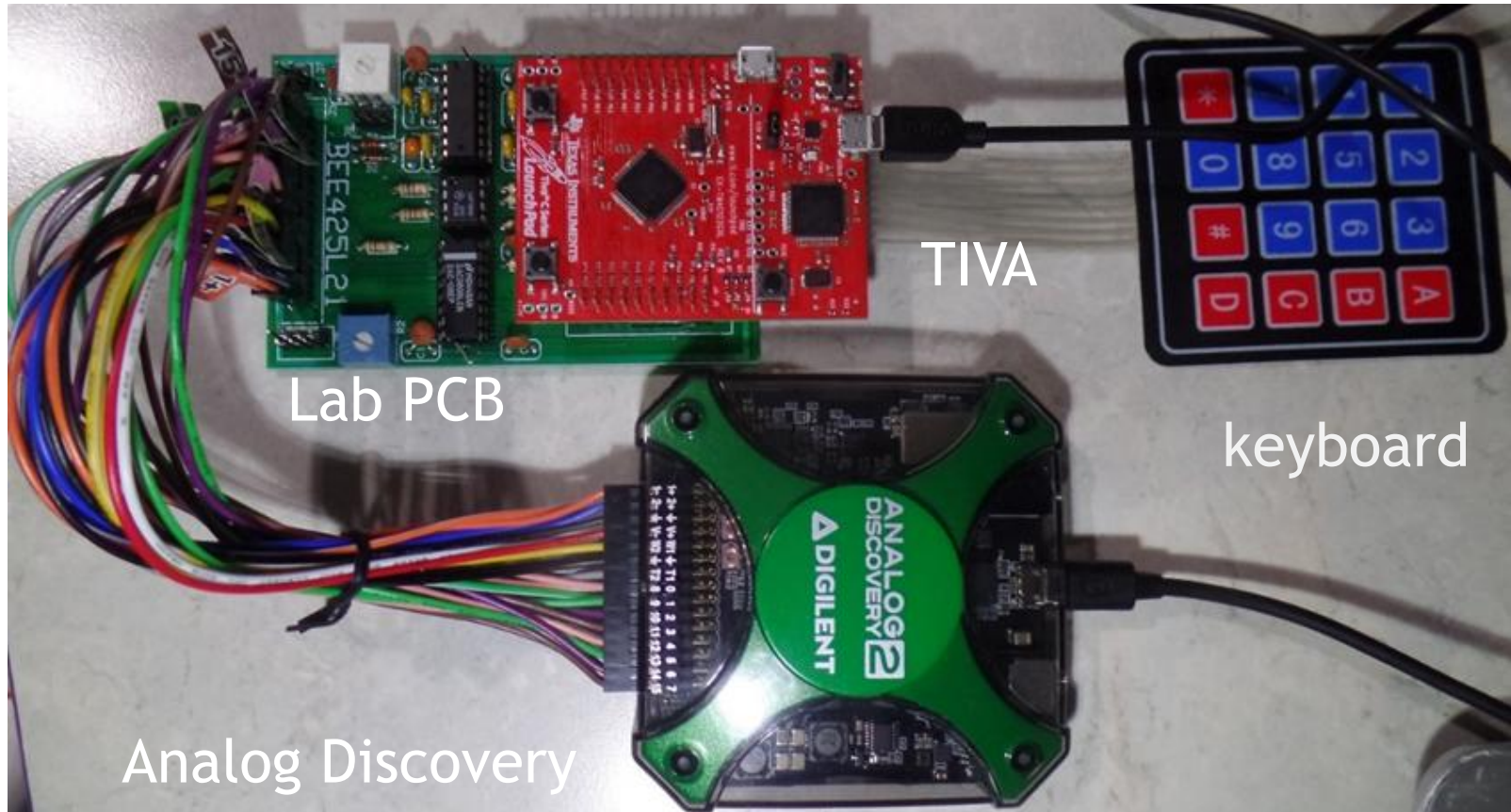
- Join groups of engineers from other companies
- Do interoperability testing between CSR prototypes and prototypes from those other companies



8b, Typical Day, UWB

- UW Bothell lecturer/teaching faculty
 - Prepare and present new material
 - Harvest and grade papers
 - Lab instructor: digital logic & Verilog, microelectronics, microprocessors
 - Weekly meetings with Capstone teams
 - Constantly reinventing material, particularly lab material, for remote labs.
 - See next slides

Example Remote lab kit:

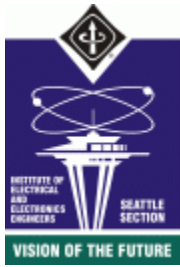


Analog Discovery: DC supplies, wave generator, 2-channel oscilloscope, 16-channel logic analyzer

ARM or RV32 CPU lab kit:



- DE-10 FPGA kit
- Loaded w/ simplified ARM CPU or RV32I
- PCB with flash ROM & SRAM
- LogicPort 32-bit logic analyzer



9 - Graduate school

Choices: MS, PhD, MBA, MD, other

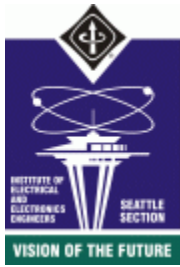
MS degrees are useful: extend what you know, and how to learn

PhDs are preferred in two areas:

- Research jobs
- Faculty jobs

MBA's are important in management

- Frequently, an MBA *follows* working in a business
- Note that good management is crucial



10a - Business Degrees

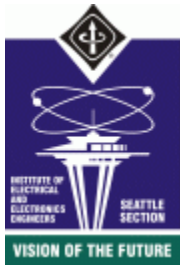
Understanding business matters, even if you do not work in management

If you want to work in management you need two sets of skills:

- Business (e.g. MBA for non-technical management)
- People management AND leadership

I had to learn some of this the hard way, from reading and experience.

If you get an MBA, consider working first



11 - PE Registration

PE Registration is essential in some kinds of engineering work:

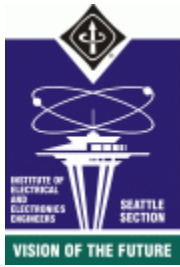
- Good rule of thumb: anything involving public safety

PE Registration is common but not essential in aerospace or automotive

PE Registration is very rare in consumer electronics, computers, software engineering, etc

I know little about registration, since I never needed it

- A PE refresher course book set is still handy for reference



12 - Professional Societies

Why join and participate:

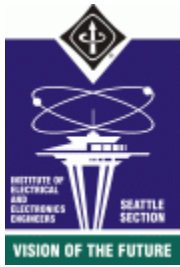
1. Professional Knowledge: journals, seminars & conferences

- The web changes a lot of things, but some of us still like to listen and ask questions.
- How many of you believe everything on Wikipedia?
- IEEE has a huge on-line resource base, mostly for members

2. Professional Community: network with fellow engineers, mutual education & support

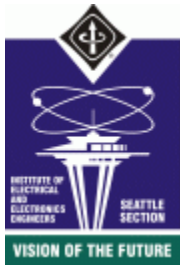
- You can't get it all in your job

3. Professional Interests: represent engineers' interests to other institutions, including state & national governments

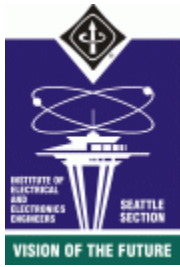


Why Boeing likes IEEE

- In summer 2008 I was IEEE Seattle Section chair. I asked Boeing HR why they like IEEE. Three reasons:
 1. They stay current, and technically useful, longer
 2. Well networked members save Boeing money, when hiring or firing
 3. Active volunteer members learn valuable team leadership soft skills



SUMMARY PREDICTIONS RESOURCES



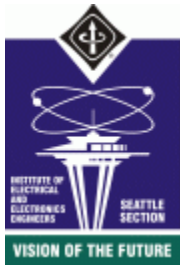
Prepare for success

- Learn constantly, including AI Literacy
- Network constantly
- Learn and practice leadership skills
 - Start with yourself
 - Seek to understand before you seek to be understood
- Manage your time
 - ALWAYS include time for health and family
- Remember to have fun
 - Remember why you are attracted to engineering



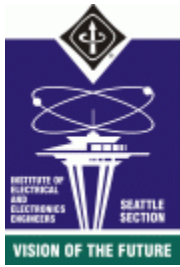
Predictions

- We engineers have a duty to the world
- We need technologies to survive
 - IEEE Spectrum June 2013 (food)
 - Humanitarian Technologies (ieeeghtc.org)
 - Sustainable Technologies (sustech.org)
- Get used to the idea that most of your career work might not exist yet
- How will our jobs change with revolutions in robotics and AI?



More Good Books

- Mythical Man-Month, Fred Brooks
 - Essays on software engineering management
- The Engineer in Transition to Management, IEEE Press
- Engineering philosophy: anything by Henry Petroski
 - My favorite: Invention by Design
- Patent it Yourself, David Pressman
- Corporate Confidential, Cynthia Shapiro
 - General advice about modern corporations and careers
- What Does Somebody have to do to get a Job Around here? Cynthia Shapiro
- Racing the Beam, Montfort and Bogost
- The Soul of a New Machine, Tracy Kidder



My contact information

Joe Decuir

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Wikipedia: https://en.wikipedia.org/wiki/Joseph_C._Decuir

Seattle Section: membership, life member activities group

IEEE Region 6: Industrial Development

Work: University of Washington, Bothell, jdecurir@uw.edu

LinkedIn: <https://www.linkedin.com/in/joedecuir/>

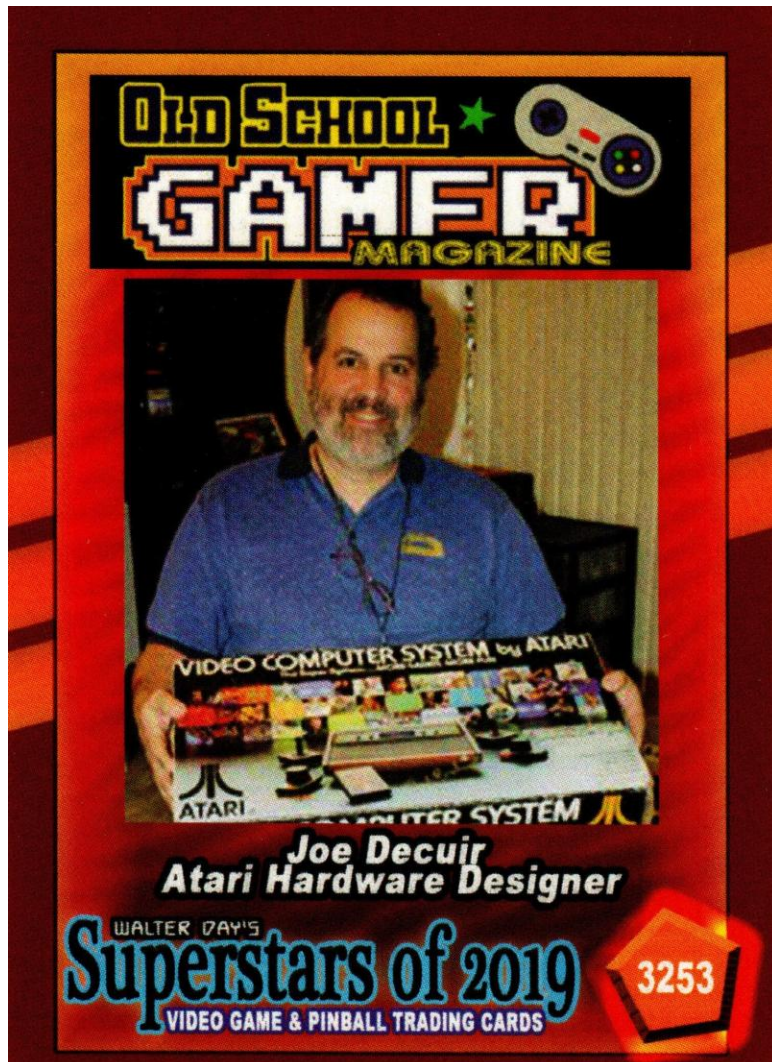
Pay it forward:

<https://www.uwb.edu/news/2025/02/21/dedicated-to-maximum-usefulness>

<https://me.berkeley.edu/news/alumni-spotlight-joe-decurir-is-paying-it-forward/>

Discord: joedecuir

More Questions?



Old School GAMER MAGAZINE

Joe Decuir
Atari Hardware Designer

WALTER DAY'S Superstars of 2019
VIDEO GAME & PINBALL TRADING CARDS

3253

Walter Day's **Superstars of 2019** VIDEO GAME & PINBALL TRADING CARDS

JOE DECUIR

Atari Hardware Designer

Decuir had the great fortune to be hired by Atari in 1975, as an apprentice to Jay Miner, working on the Atari 2600. He made major contributions to video games and personal computer graphics, on the 2600, the Atari 8-bit computers and the Amiga computer, all for Jay Miner. His contributions included: system hardware design, custom chip design (TIA, ANTIC, ANGUS), Atari SIO, some game programs and production test quality control programs. He was honored by IEEE as a Fellow for the contributions described on his well-deserved wikipedia page: https://en.wikipedia.org/wiki/Joseph_C._Decuir. He still speaks on these subjects, at various events (PRGE, VCF, MGC, etc), and he is finishing a book on the Atari 8-bit computers.

This trading card was presented by Old School Gamer Magazine (www.oldschoolgammagazine.com) on Saturday, October 19, 2019 during the 2019 Portland Retro Gaming Expo at the Oregon Convention Center, 777 NE MLK Jr. Blvd., Portland, OR 97232.

The Walter Day Collection of Video Game & Pinball Trading Cards was created to commemorate the history of the global video game & pinball culture, honoring the people, the games, the technology, and the historic milestones.

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