A love letter to engineering, and embedded systems

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V. Hunter Adams

November 13, 2023

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- What makes embedded systems projects special?
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This needs to be a **conversation**, because I'm going to try to articulate thoughts that I haven't yet figured out the best way to communicate. It's hard to explain why you love something, just like it's hard to explain why you love someone.

There are **practical** answers to this question, and there are **Hunter's personal** answers to this question. I'm going to address both but dwell on the latter, because I expect that the practical reasons are largely obvious to a group like this.

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- The engineering curriculum here will teach you how to **solve problems** with engineering. And it should! This is what you'll be paid to do, and this is the engineer's obligation to society and humanity.

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(Also, I just enjoy having conversations like this with colleagues and students)

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    - Birdsongs
    - Synchronization in nature
    - Flocking behavior
    - The behavior of fluids
    - History (Enigma & Bombe, Archaeology)
    - Algorithms/Math (FFT, Mandelbrot, Lorenz, cellular automata)
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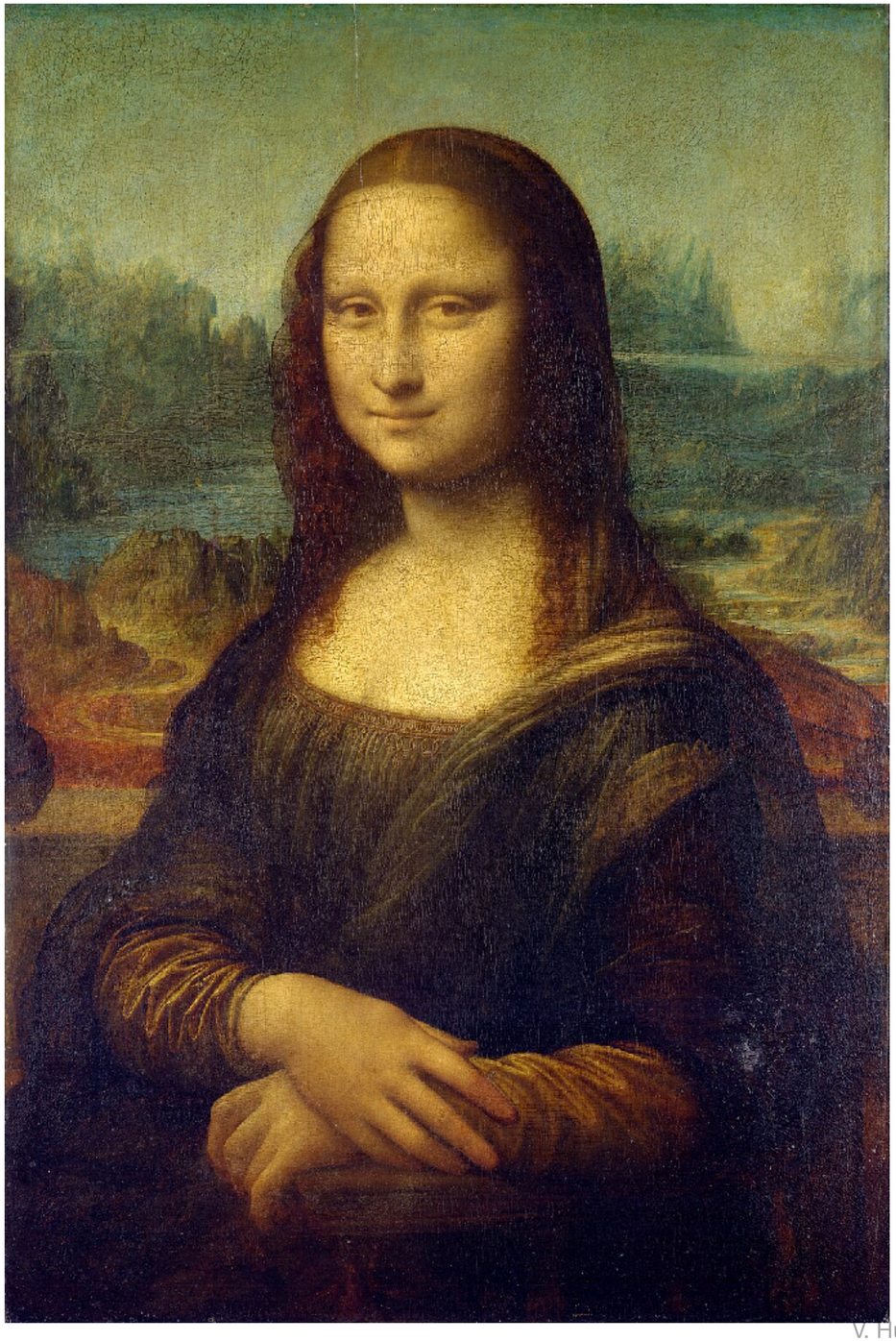
- Exploring a diversity of interests doesn't indicate a lack of commitment to your area of speciality, it makes you a better engineer! Here's one example of this fact . . .

“And what about the scholars and critics over the years who despaired that Leonardo squandered too much time immersed in studying optics, and anatomy, and the patterns of the cosmos? The Mona Lisa answers them with a smile.”

- Walter Isaacson, *Leonardo da Vinci*

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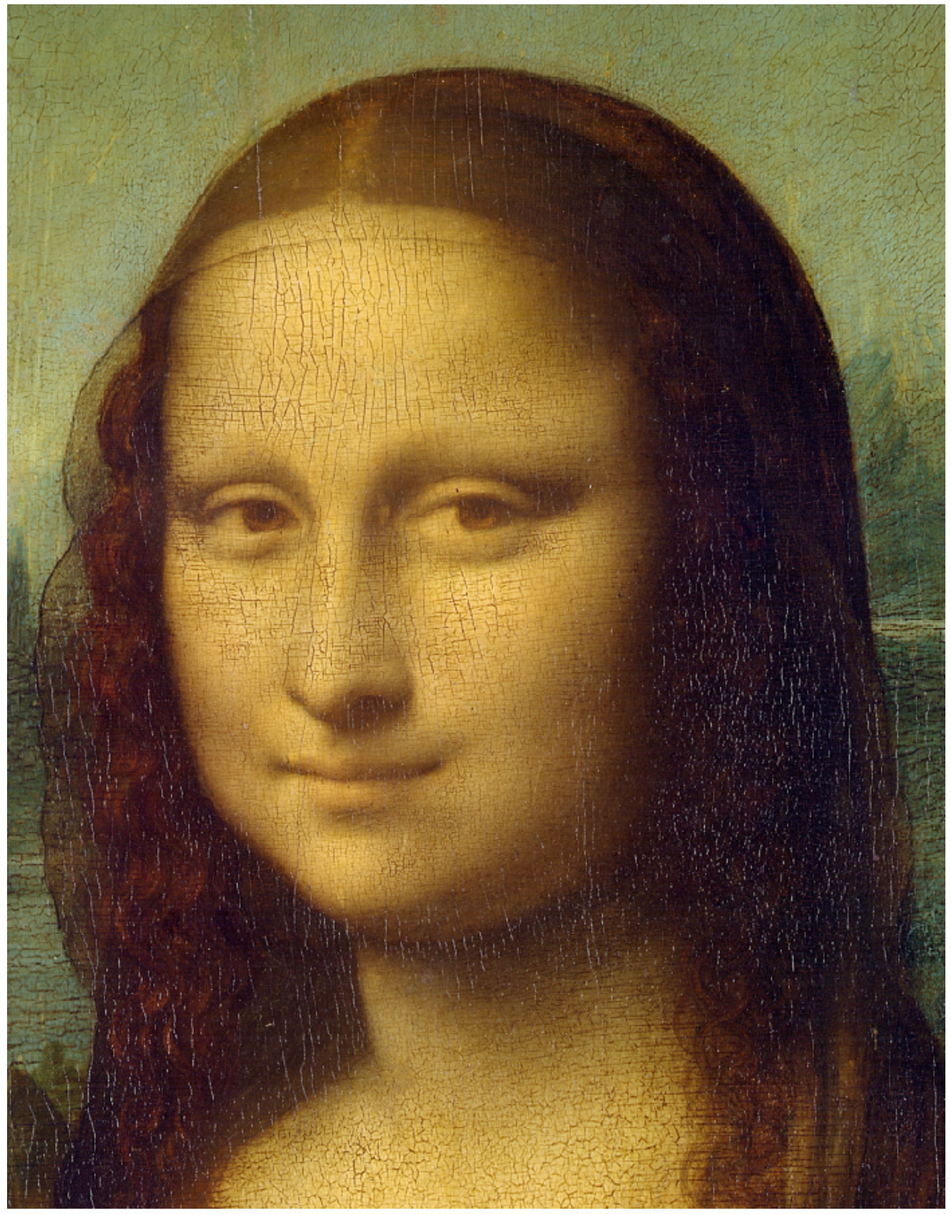
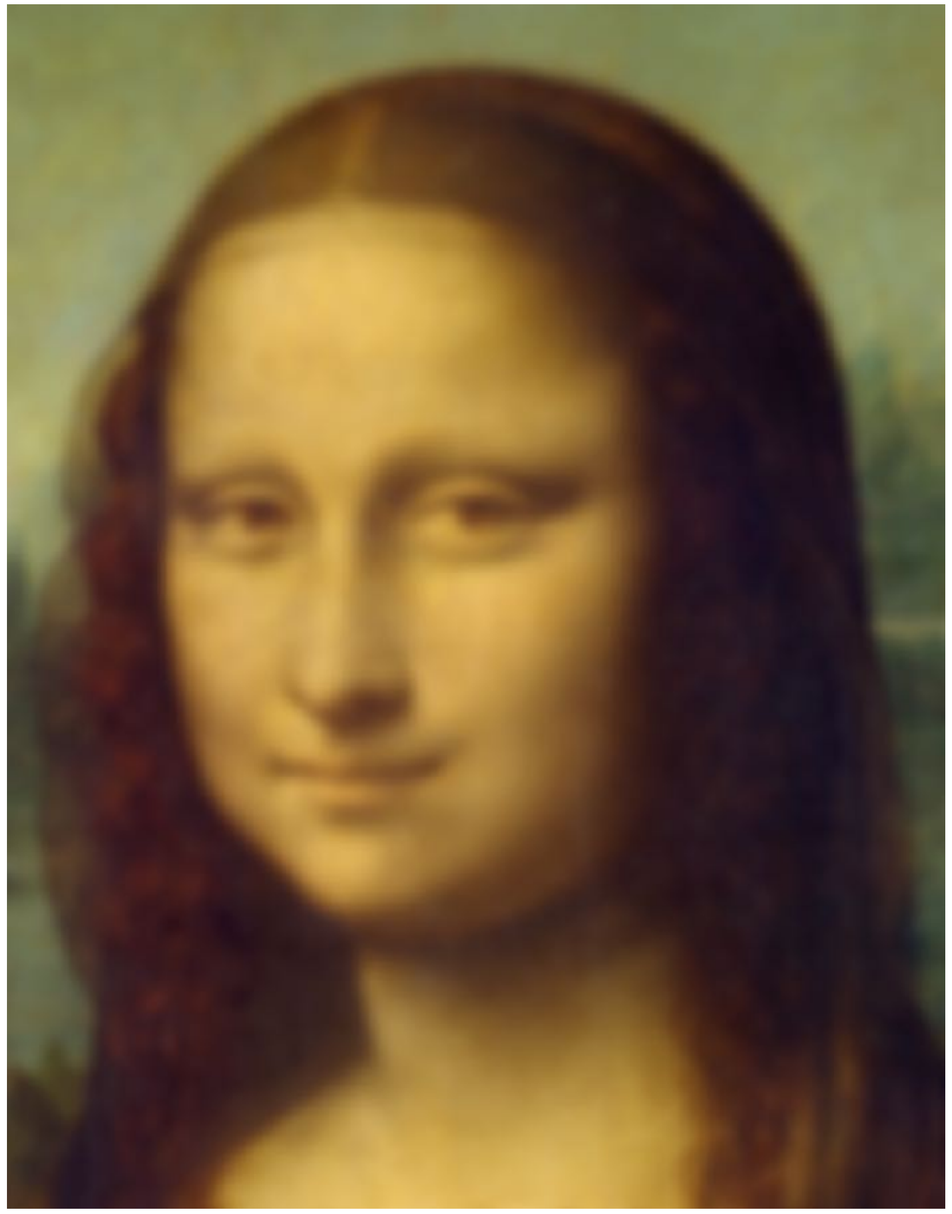
Only a person with this many interests could generate the Mona Lisa.

These weren't distractions, they made da Vinci a better painter.
And engineer. And scientist. And architect.



As Leonardo painted her



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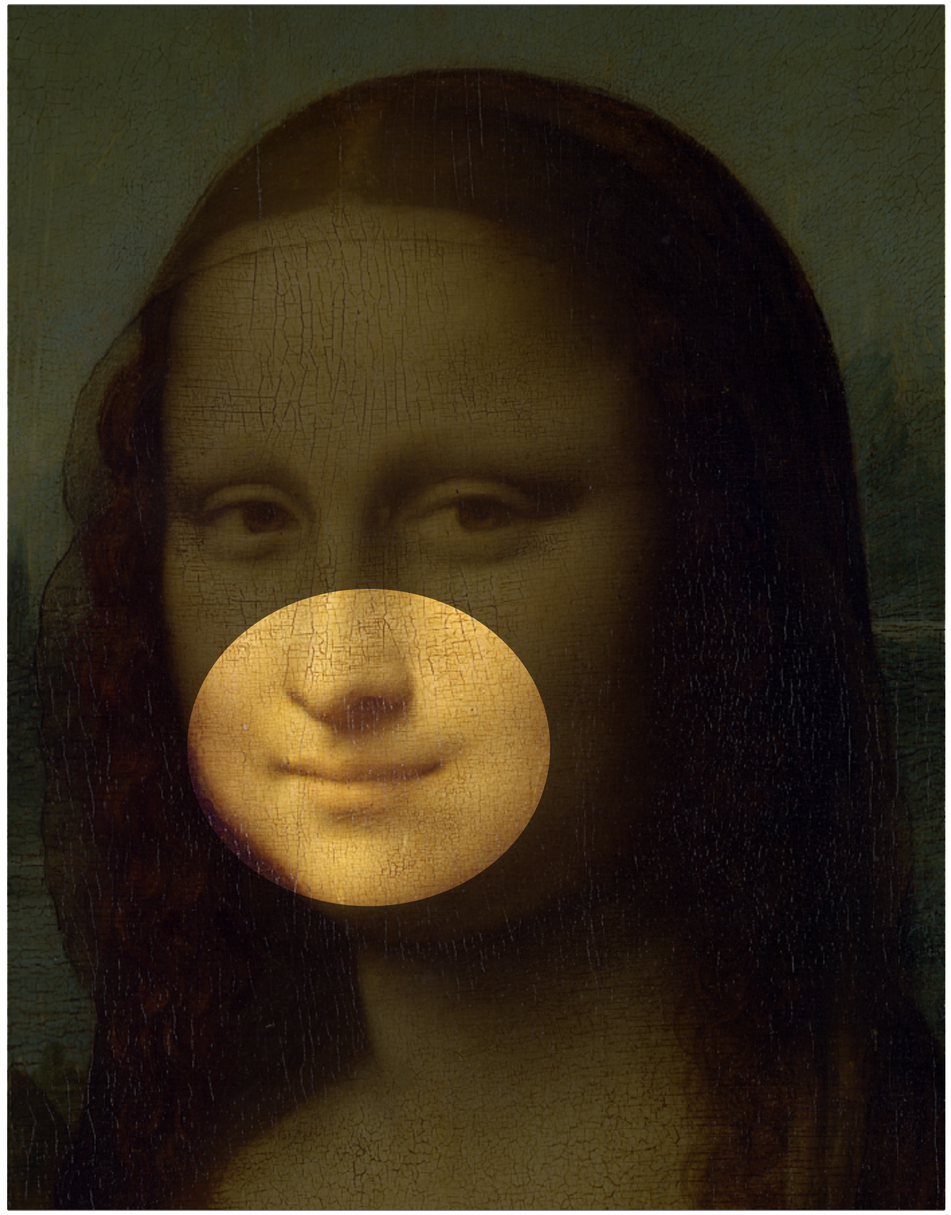
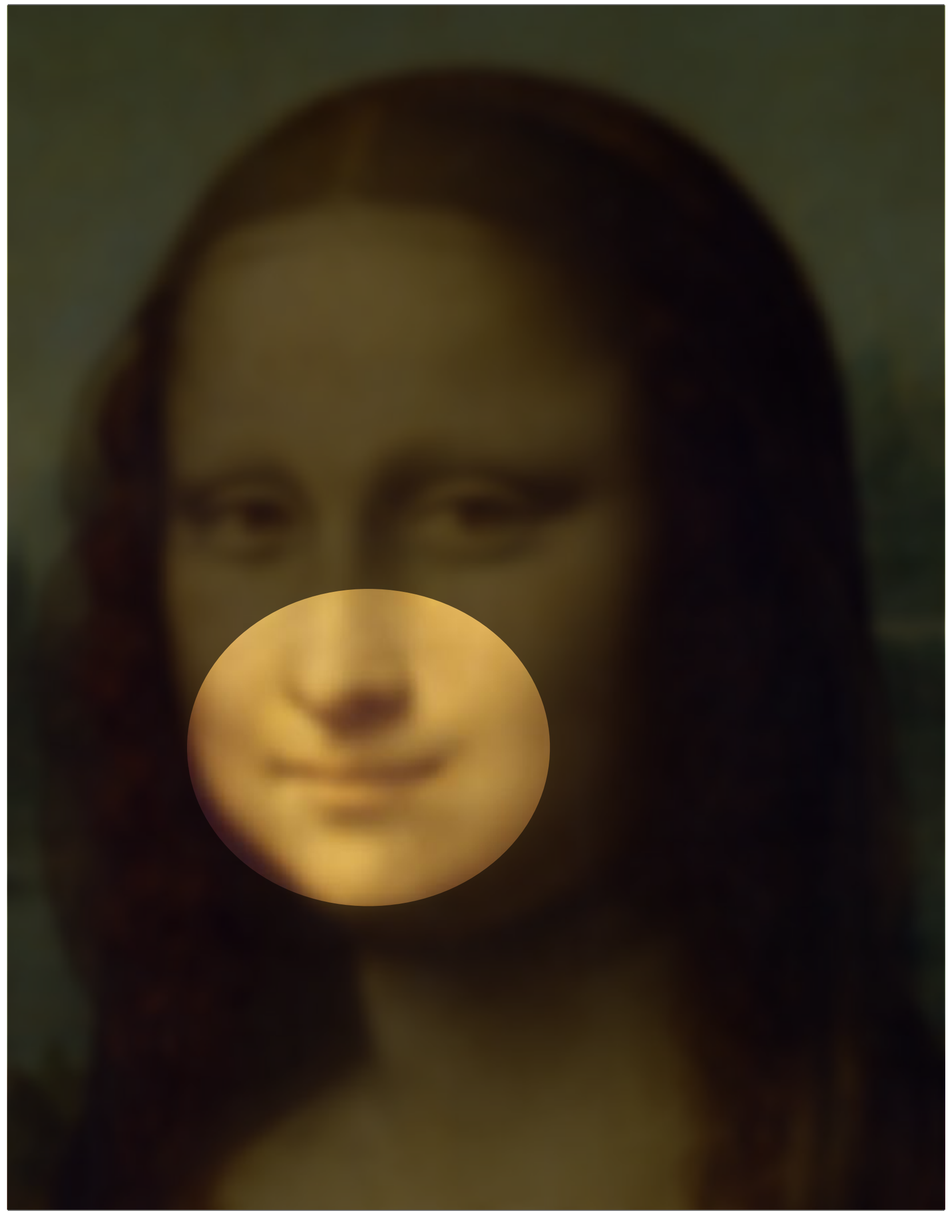




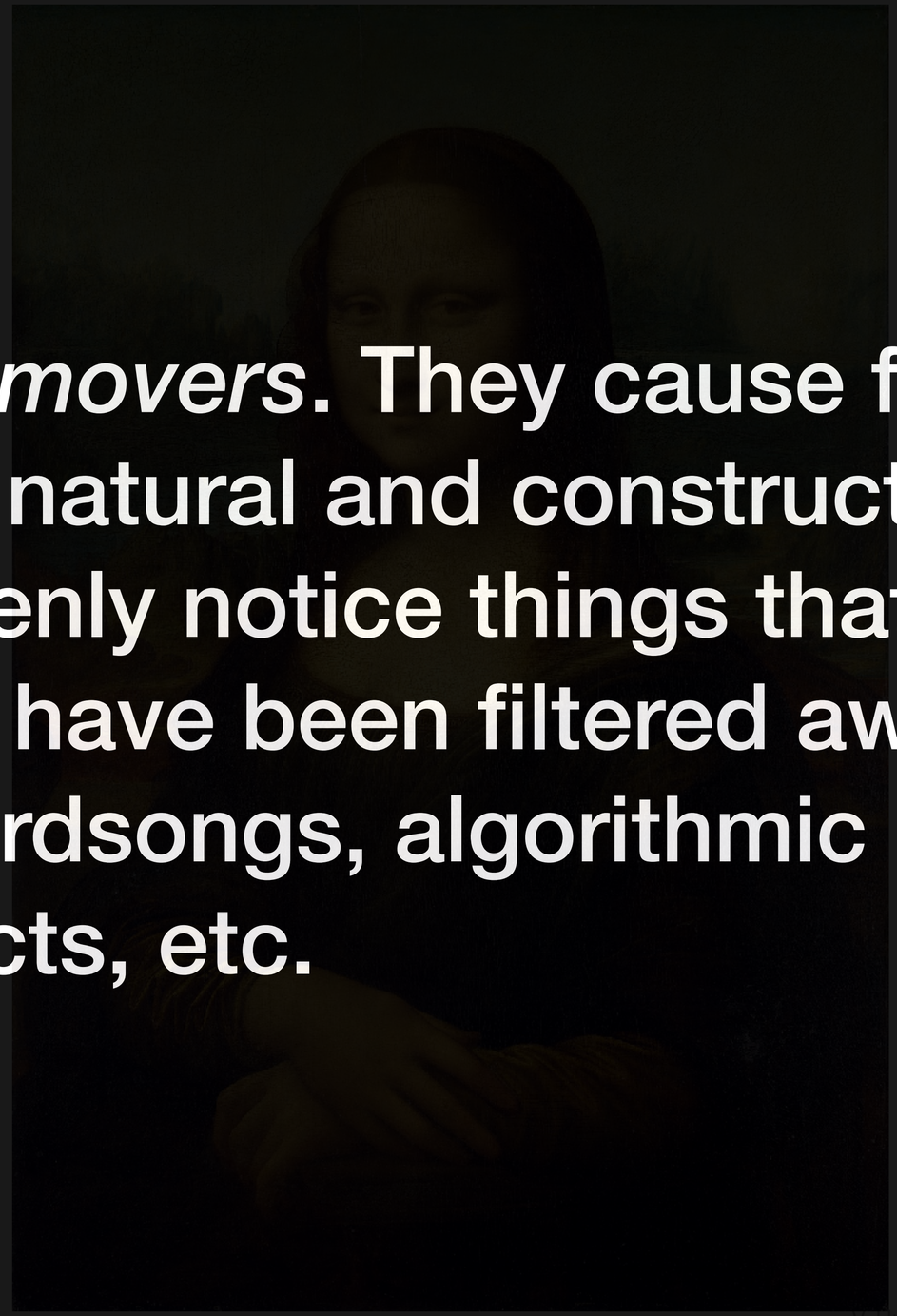
Her smile is more apparent in the lower frequencies!

“Wish away the dilettante who spent the bulk of his later life on chess, machines, and juggling, and you’d also wish away the curious genius who invented information; ***it came, all of it, from the same place****.”*

- Jimmy Soni and Rob Goodman
  A Mind at Play: How Claude Shannon Invented the Information Age

Photo: © Stanley Rowin

Engineering projects are *filter removers*. They cause for you to notice and appreciate the natural and constructed worlds in new ways. You suddenly notice things that have always been there, but that have been filtered away from your conscious mind. Birdsongs, algorithmic behavior in insects, etc.



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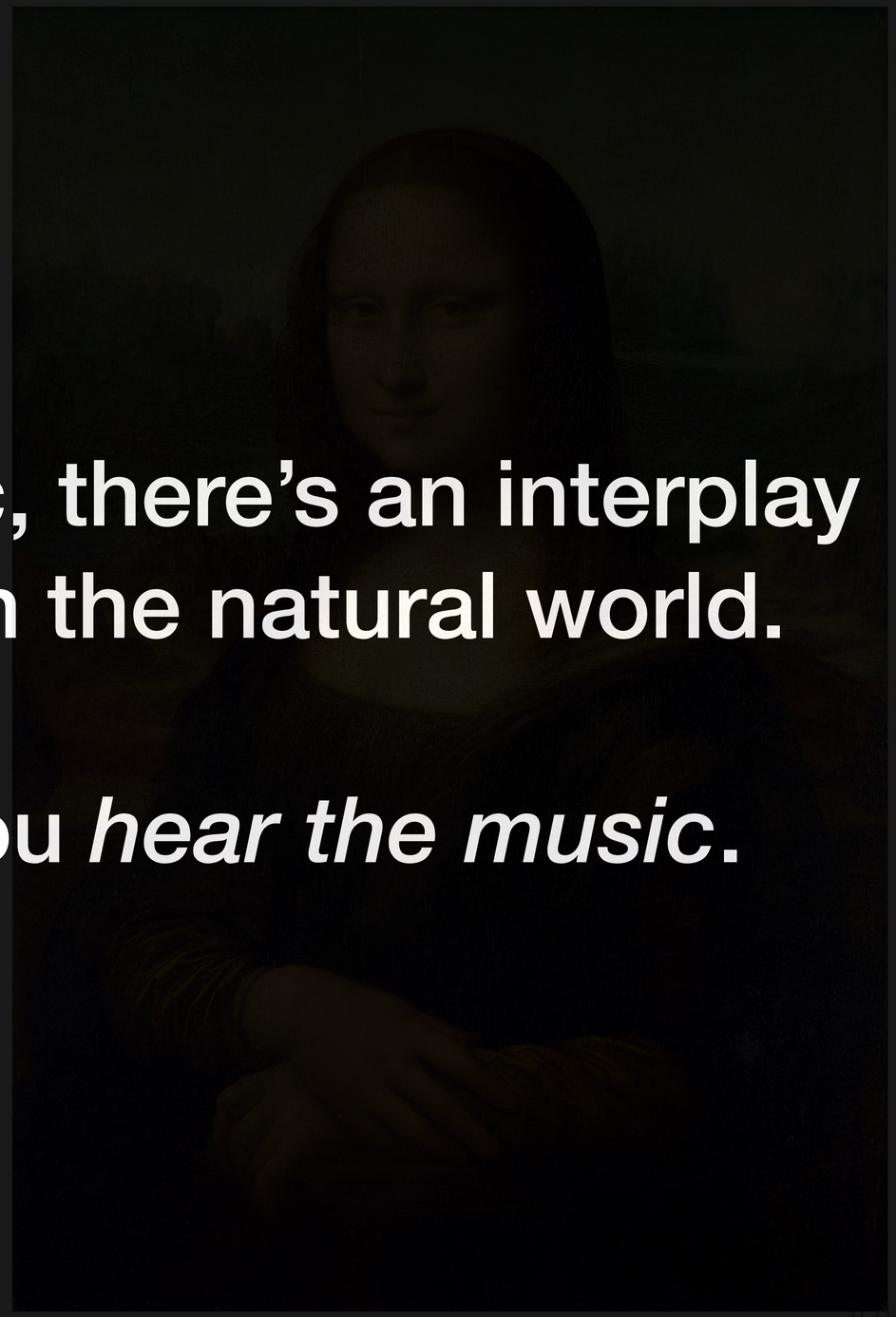

Like in a good piece of music, there's an interplay between order and chaos in the natural world.

Engineering projects let you *hear the music*.

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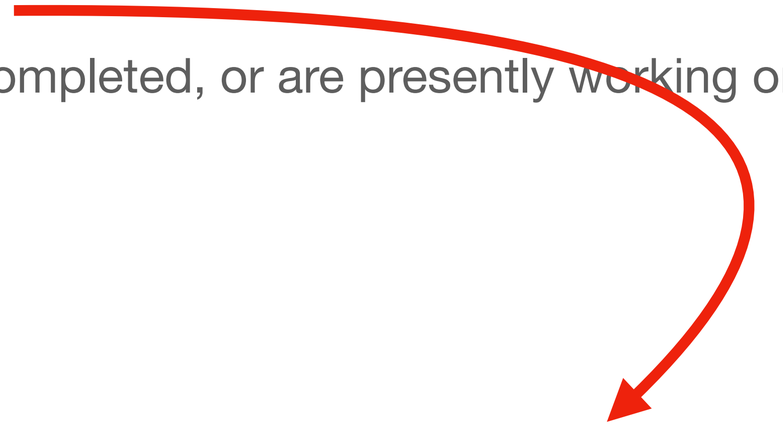

Everything I've said thus far applies to all sorts of engineering.
What's so special about embedded systems in particular (to me)?

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- They sit on the boundary between the **natural world and the computational world**, and offer unique (and beautiful) views of each.
    - One acquires a computational view of nature, and a deep understanding of computers. Our programs must know about the hardware on which they are running.
    - Debugging places you in conversation with **nature** and with **physics**. (Is the bug in software, or hardware, or is it a consequence of physics?)

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What are students working on?

- ECE 4760/5730
- ECE 5760
- ECE 6930

How can you get started on projects?

- Join the Maker Club! No previous experience is required, come join a community of students that are building cool things for fun.
- Come knock on my door! I'd be happy to brainstorm some projects that allow for you to improve your engineering abilities, while also exploring your other interests and curiosities.