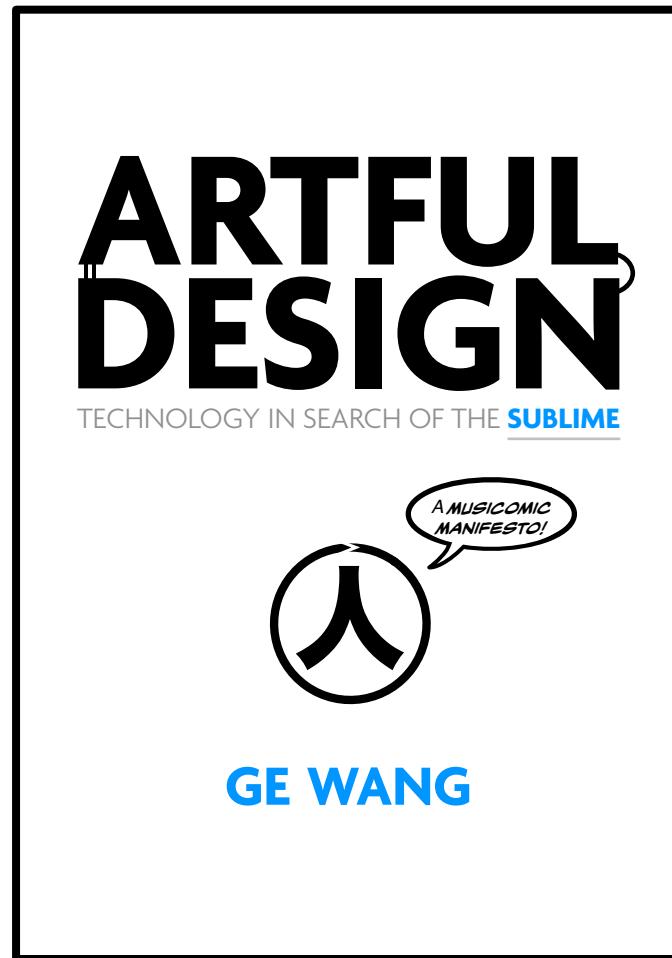


"The Pi-Shaped Person"

excerpt (pp. 426-430) from *Artful Design*,
Chapter 8 "Manifesto"



<https://artful.design/>



ALL THE WHILE, NO MATTER HOW DIRE THINGS SEEM, IT IS **MUSIC** AND THE **ARTFUL** THAT PULL US BACK FROM THE **BRINK** AND **CALM** THE SAVAGE INSIDE, OFFERING SANCTUARY AND ALLOWING US TO **TRANSCEND** BRIEFLY OUR **PETTY STRUGGLES**. HUMANS WILL ALWAYS MAKE ARTFUL THINGS, EVER STRIVING TO UNDERSTAND OURSELVES, AND TO **REACH** FOR SOMETHING **BETTER** THAN OURSELVES. IT IS THROUGH THE ARTFUL THAT WE ARE **AUTHENTICATED**, NOT SO MUCH BY ITS **GREATNESS**, BUT BY THE FACT THAT WE MAKE IT **AT ALL**.

THIS **AESTHETIC DIMENSION** IS NOT SEPARATE FROM LIFE -- IT **IS** LIFE. PERHAPS IT'S WHY WE BOther TO DESIGN **BEAUTY** INTO **USEFUL** THINGS, AND WHY WE STRIVE FOR **TRUTH** IN THE SHAPING OF **TECHNOLOGIES** THAT CONTINUE TO TRANSFORM OUR LIVES. TECHNOLOGY WITHOUT **POETRY** IS BUT A **BLUNT INSTRUMENT**, WHEREAS AESTHETICS WITHOUT UNDERSTANDING OF TECHNOLOGY IS LIKE **SOUL** WITHOUT A **BODY**. EVEN **PURE ART** NEED A MEDIUM.

IN THIS UNION OF AESTHETICS AND TECHNOLOGY, WE FIND A **THIRD THING** THAT IS NEITHER **PURE ART** NOR **PURE ENGINEERING**, BUT A **SYNTHESIS** OF TWO SEEMingly DISPARATE HUMAN ENDEAVORS...

THIS IS A CALL -- NOT FOR A **NEW WORLD** OR NEW SYSTEMS OR NEW COMPANIES, BUT FOR A NEW KIND OF **INDIVIDUAL**; A DEEP **HYBRID** BETWEEN ENGINEER, ARTIST, AND HUMANIST; A **BUILDER** WHO CAN IMBUE HUMAN **VALUES** INTO OUR **CREATIONS**. I WANT TO CALL SUCH AN INDIVIDUAL...

YOU...
THE HUMANIST
ENGINEER!

"IF IT IS **REASON** THAT MAKES MAN, IT IS **SENTIMENT** THAT GUIDES HIM."

-- ROUSSEAU

DEFINITION 8.13

...AND YES,
THE **ARTFUL**
DESIGNER!



MORE THAN PRACTICAL TOOLS AND TECHNIQUES, THE ENGINEER NEEDS **CRITICAL** TOOLS (TO QUESTION, INQUIRE, REFLECT, INTERPRET, ANALYZE, AND ARGUE) AND **EMOTIONAL** TOOLS (TO FEEL, WONDER, AND EXPRESS). THE PATH FORWARD HAS TO COME FROM **WITHIN** OURSELVES, BY FOSTERING A NEW KIND OF **HYBRID HUMAN** THAT CAN **GROK** TECHNOLOGY, ART, HUMANISM -- AS PARTS OF A SINGLE PURSUIT.

SUCH **MULTI-FACETED** HYBRIDS ARE NOT NEW. THEY HAVE PLAYED PIVOTAL ROLES THROUGHOUT HUMAN HISTORY BECAUSE THEY ARE **SYNTHEZIZERS** -- DESIGNERS CAPABLE OF **FUSING** THE **PRACTICAL** WITH THE **AESTHETIC**, THE PRAGMATIC WITH THE IDEALISTIC, THE LOGICAL WITH THE PHILOSOPHICAL.



SUCH **HYBRIDS** DO NOT NEED TO BE THE FUTURE LEADERS OF THE WORLD, NOR ITS SO-CALLED GENIUSES OR SAVANTS. THEY ARE SIMPLY ITS **DENIZENS** AND **CITIZENS**.

YEARS AGO, AS A COMPUTER SCIENCE UNDERGRAD, I FIRST ENCOUNTERED THE IDEA THAT CERTAIN WELL-DEFINED PROBLEMS (SUCH AS "WRITE A COMPUTER PROGRAM THAT, GIVEN A SECOND COMPUTER PROGRAM, DETERMINES WHETHER THE LATTER WILL **HALT** OR **LOOP FOREVER**"), PROBABLY, CAN **NEVER** BE SOLVED BY OUR NOTION OF COMPUTERS. IT WAS A **PHILOSOPHICAL** AND **AESTHETIC** MOMENT THAT MADE ME APPRECIATE THE COMPUTER ALL THE MORE... BECAUSE ON THAT DAY I UNDERSTOOD SOMETHING ABOUT WHAT **IT IS** AND WHAT **IT'S NOT**, AND THAT MORE CLEARLY DEFINED ITS TRUE NATURE. MOST OF ALL IT MADE ME A WITNESS AND PARTICIPANT TO A CERTAIN **POETRY** INHERENT IN THE DISCIPLINE OF COMPUTER SCIENCE, THAT IT IS A **HUMAN** INQUIRY, MEDIATED BY TECHNOLOGY -- **NOT** THE OTHER WAY AROUND...



SAY IT WITH ME...
ENTScheidungsproblem
-- THE DECISION PROBLEM!

THE FORMULATION AND PROOF FOR THE **HALTING PROBLEM**, LIKE ITS SPIRITUAL COUSIN IN LOGIC, **GODEL'S INCOMPLETENESS THEOREM**, ARE TRIUMPHS OF HUMAN THOUGHT. THEY TELL US THAT THERE ARE ASPECTS TO OUR SEARCH FOR TRUTH THAT WE CANNOT FULLY HAND OVER TO THE AUTOMATED STEWARDSHIP OF OUR CREATIONS, THAT THERE MAY ALWAYS NEED TO BE A CORE **HUMAN ELEMENT** THEREIN. THERE IS A **FUNDAMENTAL LIMIT** TO PROVABILITY AND TO COMPUTABILITY -- AND THAT IS PROFOUND.



TO BE A HUMANIST ENGINEER IS TO BE AWARE OF THE **METAPHYSICAL** (E.G., PURPOSE, FUNCTIONALITY, AND LIMITS), THE **ETHICAL** (E.G., WHAT IS GOOD? WHAT IS JUST? THE DIFFERENCE BETWEEN TECHNOLOGY AS A MEANS VS. AN END), AND THE **AESTHETIC** (E.G., THE BEAUTY, TRUTH, AND POETRY INHERENT IN OUR ACTIONS AND PURSUITS).

DEFINITION 8.14

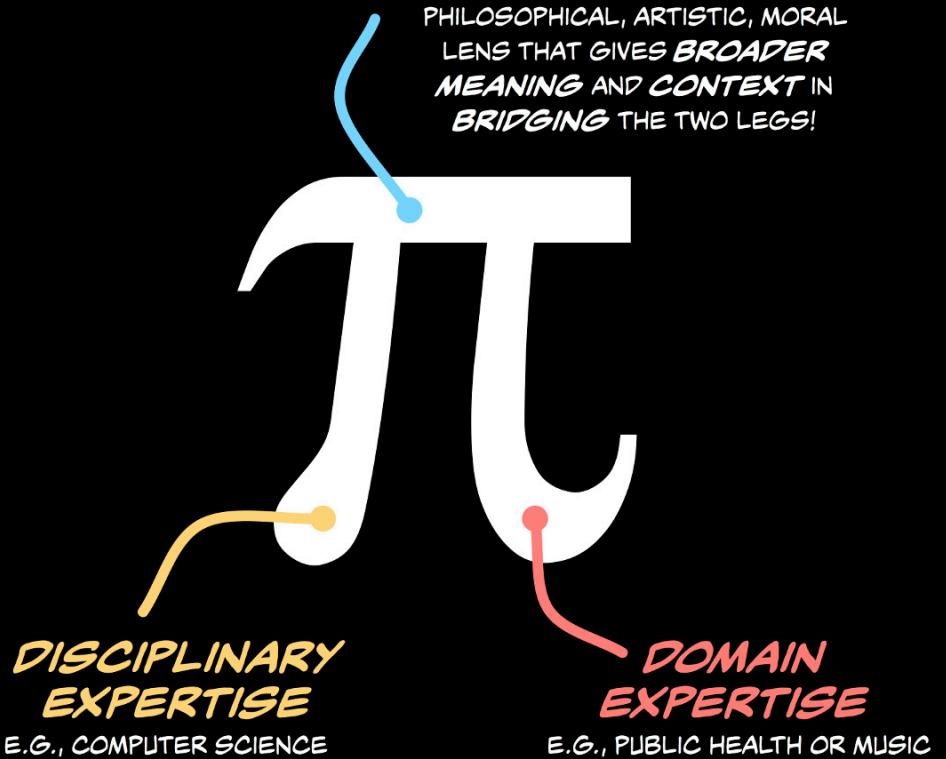
THE π -SHAPED PERSON

THE HUMANIST ENGINEER IS AN INDIVIDUAL WHO IS ABLE TO INTEGRATE DEEP ENGINEERING KNOWLEDGE WITH A BROADER HUMANISTIC CONTEXT (AESTHETIC, MORAL-ETHICAL, PHILOSOPHICAL). MORE THAN A SPECIALIST, THIS IS SOMEONE WHO IS CAPABLE OF SHAPING THE WORLD FROM NOT ONLY PRACTICAL NEEDS, BUT ALSO FROM THE UNDERLYING VALUES.

TRANSLATED INTO AN EDUCATIONAL CONTEXT, THE CRAZY IDEA HERE IS TO TEACH AESTHETICS, HUMANITIES, AND ENGINEERING IN CONJUNCTION, EMPHASIZING THE DEEP INTERPLAY BETWEEN THEM. IN HIGHER EDUCATION, WE SPEAK OF THE NOTION OF A "PI-SHAPED STUDENT," WHERE THE LETTER PI REPRESENTS DISCIPLINARY EXPERTISE ON ONE LEG (E.G., COMPUTER SCIENCE) AND DOMAIN EXPERTISE ON THE OTHER (E.G., PUBLIC HEALTH OR MUSIC); THE HORIZONTAL BAR REPRESENTS AN AESTHETIC LENS THAT GIVES BROADER CONTEXT IN BRIDGING THE TWO LEGS.

AESTHETIC LENS

PHILOSOPHICAL, ARTISTIC, MORAL
LENS THAT GIVES BROADER
MEANING AND CONTEXT IN
BRIDGING THE TWO LEGS!



MANTRA 8.15

DO. THINK. FEEL.

DOING WITHOUT THINKING IS DANGEROUS.
THINKING WITHOUT FEELING IS BANEFUL.
FEELING WITHOUT DOING IS POWERLESS.

...MUST COMBINE!



FRANCIS BACON

IT WOULD BE MADNESS TO EXPECT TO ACHIEVE RESULTS NEVER BEFORE ACCOMPLISHED -- EXCEPT THROUGH A MEANS NEVER BEFORE ATTEMPTED!

IN ORDER FOR US TO TRULY MOVE FORWARD, THE NARRATIVE OF OUR EDUCATIONAL AND TECHNOLOGICAL INSTITUTIONS MUST EVOLVE -- FROM A PRIMARILY NEED-DRIVEN AND PROBLEM-SOLVING NARRATIVE TO A VALUE-BASED, SELF-DEFINING (AND STILL PROBLEM-SOLVING) ETHOS. AS AN ENGINEER MYSELF, I OBVIOUSLY CHAMPION PROBLEM SOLVING, BUT A CORE ISSUE WITH THE SOLUTION-CENTRIC NARRATIVE IS THAT MUCH OF THE HUMANITIES AND ARTS (AND LIFE ITSELF) IS NOT ABOUT SOLVING PROBLEMS (E.G., MUSIC, PHILOSOPHY, HISTORY AREN'T "PROBLEMS TO BE SOLVED"). RATHER, THEY ARE ABOUT EVER MORE FULLY UNDERSTANDING AND EXPRESSING OURSELVES AS HUMAN BEINGS. AT THE SAME TIME, I, FOR ONE, BELIEVE ENGINEERING IS CAPABLE OF MORE THAN "SIMPLY" SOLVING PROBLEMS. THROUGH HOW WE SHAPE THE WORLD, WE CAN SPEAK AUTHENTICALLY TO WHO WE ARE (NOT UNLIKE ART AND THE HUMANITIES). THE ETHOS OF THE HUMANIST ENGINEER TIES THIS TOGETHER!

PATRON SAINTS OF HUMANIST ENGINEERING

THE IDEA OF COMBINING ART, THE HUMANITIES, AND ENGINEERING IS NOT NEW. RATHER, IT IS SOMETHING WE HAVE TO RECOVER, SOMETHING WE MAY HAVE LOST IN OUR QUEST FOR SPECIALIZATION. BUCKMINSTER FULLER HAD THE NOTION OF A COMPREHENSIVE ANTICIPATORY DESIGN SCIENTIST -- "AN EMERGING SYNTHESIS OF ARTIST, INVENTOR, MECHANIC, OBJECTIVE ECONOMIST, AND EVOLUTIONARY STRATEGIST." THERE ARE ECHOES OF SUCH HYBRIDS THROUGHOUT HISTORY -- ARISTOTLE, DA VINCI, MICHELANGELO, ADA LOVELACE, AND MANY OTHERS WHO NATURALLY BRIDGED WHAT WE THINK OF TODAY AS "SEPARATE DISCIPLINES"...



ARISTOTLE
THE LOGICAL
ETHICIST

LEONARDO
THE INVENTOR
ARTIST

ADA LOVELACE
THE POETICAL
PROGRAMMER

AND... WILE E.
COYOTE! (THE
UNRELENTING
DESIGNER!)

YES! THE PATRON SAINT OF
BUILDERS, HACKERS, AND
THOSE WHO PERSEVERE!

"If it is reason that makes man, it is sentiment that guides him."

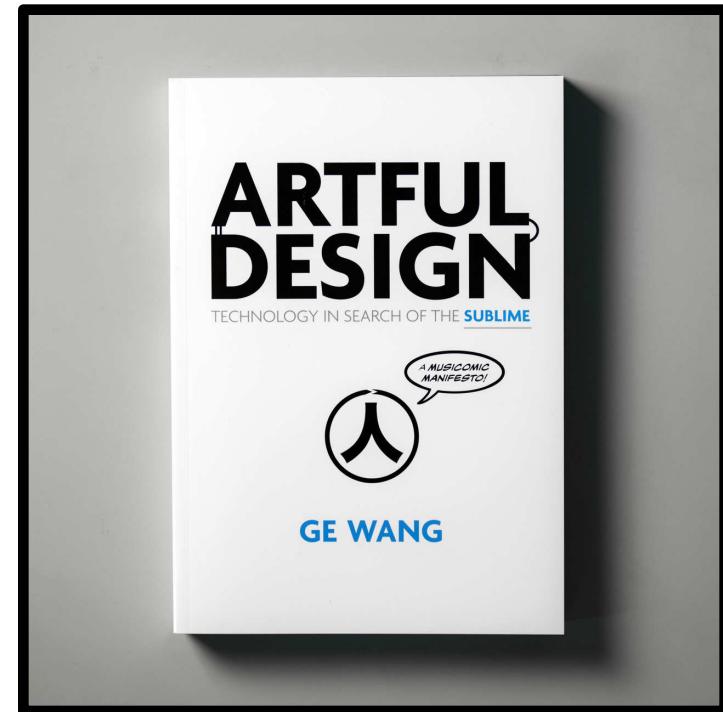
—**Jean-Jacques Rousseau** (1761)
Julie, or the New Heloise

AESTHETICS FIRST

It may seem a radical idea to prioritize **aesthetics**—before science, technology, engineering, even before ethics and morality. And yet aesthetics—the intellectual-emotional recognition of beauty not only artistic but broadly humanistic—provides the human context and impetus to learn subjects requiring advanced logic and reason, in a way that is not anchored solely in the calculus of need, but with an artfulness that can only be human. To value things for their intrinsic worth, beyond pure function, may well be to appreciate a core condition of being human.

In our increasingly technological society, we lack an aesthetic dimension—a baseline awareness of shared humanity and the beauty underlying our capacity for reason, civility, and morality. If there is truth to this line of thinking, then today's engineer may need to become much more than a specialist and evolve into a synthesis of a technological artist, a moral-ethical inventor, and a compassionate system designer.

Although aesthetics is not the direct conduit for knowledge, discovery, innovation, civil society, or governance, it supplies a common humanity that stands to make us capable and worthy of such achievements. Alongside **science**, **technology**, **engineering**, **mathematics**, we need to educate ourselves in **aesthetics**. Before we can truly know other things, we must learn to be human beings.



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