

THE BIG IDEAS



Hold on to the Doubt
#HOTTD

Self-Authorize
To optimize.

Note to Younger Self
Do good work. Get vacuumed up.

"I Also Worked Out."
A lot.

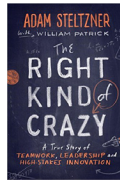
The Dark Room
Process the negatives.

Radio Shack on Mars
Naughty bits + mundane bits.

Be Curious
+ Courageous.

*"As I drove home that night,
I kept thinking about this
movement in the sky-what I'd
now call celestial mechanics-
and for the first time in a
long, long while, I was deeply
curious about something.
And that curiosity changed
my life."*

~ Adam Steltzner



The Right Kind of Crazy

A True Story of Teamwork, Leadership, and High-Stakes Innovation

BY ADAM STELTZNER WITH WILLIAM PATRICK · PORTFOLIO © 2016 · 256 PAGES

"On its face, this is the story of an audacious engineering project: the design and construction of a hugely complex rover and the innovative, 'crazy' landing system that delivered that rover to Mars. But that's just the basic plot.

This is also a personal story about how I ended up at the Jet Propulsion Laboratory building spacecraft and how I learned from my time at the lab to lead an extremely talented team to solve impossible problems. It is a story about harnessing human curiosity to build something truly fantastic and about being honest enough about human nature to protect ourselves from self-deception on a scale that could bring disaster. And it's an exploration of the thought processes, leadership techniques, and problem-solving skills that went into making such an exceptional effort possible."

~ Adam Steltzner from *The Right Kind of Crazy*

Have you seen [the sky crane that dropped the rover on Mars?](#)

It's nuts.

Well, technically, it's the right kind of crazy.

[Adam Steltzner](#) was the Jet Propulsion Laboratory (JPL) engineer who led the group of genius rocket scientists that made that near-impossible feat happen. Not bad for a guy who barely graduated from high school and got an F+ in his high school math classes, eh?

This is his personal story and the story of, as the sub-title suggests, "*Teamwork, Leadership and High-Stakes Innovation*."

It's a fun, fascinating, quick-reading, brain-bending book that will stretch your mind + imagination of what's possible in general, and what's possible within your life in particular.

I enjoyed it and if you liked watching/reading *The Martian* and want to get some leadership wisdom on in the context of a fun space-adventure autobiography, I think you'll dig it. (Get a copy [here](#).)

I'm excited to share some of my favorite, practical Big Ideas so let's jump straight in!

HOLD ON TO THE DOUBT (#HOTTD)

"When I took physics back at the college of Marin, we were allowed to bring one sheet of paper into each test. On that one sheet, we could have anything we wanted. Most students would take a 000 (ultrafine-point) Radiograph pen and write down every equation in the book. My sheet of paper might list a few of the governing laws we'd been studying, but most of the page was devoted to the words 'Hold on to the doubt!' usually written in bright colors with a highlighter pen.

"With each of these steps, I committed more, to life, to the present—to risking more. I would bring myself more fully to my life, both professional and personal. My work was changing me, and I in turn would try to change it."

~ Adam Steltzner

Through my dad I knew full well that fear of failing was enough to cause me to fail. Staring at the blank space beneath the problem was sufficiently anxiety-provoking that it could lead me to rush to an ill-considered answer. Jumping too soon into solution space might cause me to miss some key element of the problem being posed or to answer a conceptually adjacent question.

I resolved that the solution for my anxiety while staring at the unanswered question was to remain calm in the presence of openness, to not close off the inquiry too soon and thus run at full speed into a solution that might not take the whole truth of the problem into account. Holding on to the doubt meant listening to all that the problem had to say and not making assumptions, and committing to a plan of action based on them, until the deepest truth presented itself.

It was a philosophy that would serve me well in my time at JPL."

"Hold on to the doubt!"

That's one way to approach a physics test and career trying to land stuff on Mars, eh?

Science confirms Adam's wisdom that the fear of failure makes that failure more likely. In fact, here's what the [Make It Stick](#) authors (see Note) tell us about the science of successful learning:

"Let's return to the old saw 'If you think you can, or you think you can't, you're right.' It turns out there is more truth here than wit. Attitude counts for a lot. The studies of psychologist Carol Dweck have gotten huge attention for showing just how big an impact one simple conviction can have on learning and performance: the belief that your level of intellectual ability is not fixed but rests to a large degree in your own hands. ...

Dweck's research has been triggered by her curiosity over why some people become helpless when they encountered challenges and fail at them, whereas others respond to failure by trying new strategies and redoubling their effort. She found that a fundamental difference between the two responses lies in how a person attributes their failure: those who attribute failure to their own inability—'I'm not intelligent'—become helpless. Those who interpret failure as the result of insufficient effort or an ineffective strategy dig deeper and try different approaches."

Adam is the EMBODIMENT of the growth mindset.

We simply can't tolerate ambiguity and challenges if we think our intelligence/worth is at stake with every potential mistake. Blank pages freak us out.

To really lean into those challenges and "Hold on to the doubt!" we need to *KNOW* that, with hard work and persistence and a willingness to try a bunch of different strategies, we have a very good shot at getting the answer right. Never a guarantee, of course, but a solid shot.

How's your tolerance of ambiguity these days?

Can you step back, allow the unknown to be present and diligently, patiently, and persistently work through the potential solutions?

#HOTTD

SELF-AUTHORIZE

"One of my favorite Teddy Roosevelt quotes is 'Far and away the best prize that life offers is the chance to work hard at work worth doing.' I feel very lucky to think that the work I do is worth doing. I also feel very lucky to work on a scale that requires people to work together in teams. I appreciate teamwork so much that I've developed a riff on Mr. Roosevelt's quote: 'That great work requires many people coming together is one of the great prizes life has to offer.'

To really participate as a member of a team, you have to bring yourself to the process. Bringing all that you have requires offering your opinion in the absence of an invitation. It requires self-

authorization. You need to believe that you have the answer, and you need to give it to the team, even if you only *think* you have the answer. It is a form of leadership, and it is needed at every level and in every element within a healthy and high-functioning team.”

Self-authorization.

If we want to show up as an optimal team member in our work and broader role as a human being on planet Earth, we need to trust ourselves enough to speak our truth.

Is there a way you can self-authorize a little more today?

NOTE TO MY YOUNGER SELF

“Nothing puts more weight into your opinion than that it is well considered, well articulated, and coming from a high performer. If you want people to take you seriously, better put your head down and be useful to them.”

~ Adam Steltzner

“Here’s what I wish I could tell my younger self: Advancement and influence in any industry do not in general keep pace with an industry’s most famous outliers. At least in a meritocracy, such as JPL, if you do good work and really focus on mastery and excellence, good things happen, for the institution and for you. That is not to say that ‘the institution’ is a benevolent, all-knowing and all-rewarding entity, but any institution desperately needs good people. There is a vacuum at the top. Their desire for good people and talent is insatiable. If you do good work that is valuable to the institution, you will inevitably be vacuumed upward.”

I love this: “*Advancement and influence in any industry do not in general keep pace with an industry’s most famous outliers.*”

Two things.

First, let’s not compare ourselves to the youngest, most exceptionally successful and famous people in our cohort if we want to be happy. (Laughing as I type that.)

Seriously. Social comparison is TOXIC.

As [Sonja Lyubomirsky](#) tells us in [The How of Happiness](#) (see Notes): “*You can’t be envious and happy at the same time. People who pay too much attention to social comparisons find themselves chronically vulnerable, threatened, and insecure.*”

Plus: “*The happier the person, the less attention she pays to how others around her are doing.*”

Second, when I read that line, I think of [George Leonard](#) and his wisdom from [Mastery](#).

Just as advancement in any field does not in general keep up with the pace of an industry’s most famous outliers, a true sense of happiness and flourishing and mastery does not keep up with the pernicious pace of media + modern society.

Here’s how Leonard puts it: “*In all of this [media], the specific content isn’t nearly as destructive to mastery as is the rhythm. One epiphany follows another. One fantasy is crowded out by the next. Climax is piled upon climax. There’s no plateau.*”

Plus: “*If you’re planning to embark on a master’s journey, you might find yourself bucking current trends in American life. Our hyped-up consumerist society is engaged, in fact, in an all out war on mastery.*”

So, let’s put our heads down, do good work and make ourselves useful as we honor our own rhythms in pursuit of mastery.

P.S. What note would YOU write to your younger self?

Dear Younger Self: _____

P.P.S. Now a good time to live that?

"Anybody can come up with a wild idea. It's this 99 percent perspiration-implementation that's in some sense the true test."

~ Adam Steltzner

"I ALSO WORKED OUT. A LOT."

"I liked being in the middle of an intense, high-stakes storm, but I also felt how easily it could sweep me away. Some people handled the pressure with grace, and others folded. I aspired to be in the former camp, so I fashioned an approach: Whenever I felt I was being swept up in the storm, I visualized being in a warm coat on a snowy slope with a blizzard swirling around me. I would focus on the warmth and calm inside my coat and the beauty of the storm outside.

I also worked out. A lot. I would run two to five miles pretty much every morning, and some nights would return from work so pumped that I'd go for another run. It kept my stress in check and kept me from eating and drinking myself into oblivion, which was my other alternative."

In addition to that warm coat in the middle of the blizzard, Adam worked out.

A lot.

(Hah.)

The most stressful times call for our deepest commitment to the fundamentals.

(Echo echo!)

May we always remember that not exercising is like taking a depressant.

Here's to popping our virtual Ritalin + Prozac in the form of our favorite workouts as we get a 12 hour mood boost and navigate our blizzards with grace!

THE DARK ROOM

"This is the point at which Tom Rivellini reminded me of the old saying, 'The coward dies a thousand deaths.' There's plenty of time to confront 'the worst' if it comes to that, so there's no point rushing ahead to assume that you've reached it. Today I tell my teams, 'Just keep working, and if death comes to visit us, let us be surprised.' Where there is will and ingenuity, there has always been a way."

~ Adam Steltzner

"There comes a moment in every creative or innovative process when you're not only lost; you're not even sure where to find a map. Spending time in this Dark Room is terrifying, but there is no easy way out. You have to stay calm, hold on to the doubt, listen to the problem, and keep thinking of solutions while avoiding the mind-locking panic that you won't find one in time. We were in the Dark Room with those parachutes, and our only way out was persistence. What solution could we use that could survive the abrasion? How could we beat the Black Rock. ...

The toughest thing about the Dark Room is that you don't know if it's the darkness before dawn or the darkness before pitch-black. Your stress hormones are flowing, so there's no shortage of motivation to stick with it. The challenge is to avoid a sense of hopelessness."

The Dark Room.

Every great creative process (and I would imagine life for most people—certainly for me!) includes at least one trip into the Dark Room.

As I read Adam's line about the stress hormones flowing, I immediately think of [Kelly McGonigal](#)'s great book [The Upside of Stress](#) (see Notes).

Adam touches on the challenge of avoiding hopelessness. Here's how McGonigal frames it—juxtaposing the fight-or-flight response and the challenge response:

"Like a fight-or-flight response, a challenge response gives you energy and helps you perform under pressure. Your heart rate still rises, your adrenaline spikes, your muscles and brain get more fuel, and the feel-good chemicals surge. But it differs from a fight-or-flight response in a few important ways: You feel focused but not fearful. You also release a different ratio of stress hormones, including higher levels of DHEA, which helps you recover and learn from stress. This raises the growth index of your stress response, the beneficial ratio of stress hormones that can determine, in part, whether a stressful experience is strengthening or harmful...

People who report being in a flow state—a highly enjoyable state of being completely absorbed in what you are doing—display clear signs of a challenge response. Artists, athletes, surgeons,

"As with many people, or perhaps all of us, my greatest strengths, when concentrated too heavily, become my greatest weaknesses."

~ Adam Steltzner

video gamers, and musicians all show this kind of stress response when they're engaged in their craft or skill. Contrary to what many people expect, top performers in these fields aren't physiologically calm under pressure; rather, they have strong challenge responses. The stress response gives them access to their mental and physical resources, and the result is increased confidence, enhanced concentration, and peak performance."

The challenge response vs. the fight-or-flight response.

Your heart rate still rises and adrenaline spikes and muscles and brain get more fuel while feel-good chemicals spike AND you feel focused rather than letting the terror take over—holding on to the doubt and persistently taking the next baby step in pursuit of more clarity.

With that approach, we get to use all the goodness from the challenge while concocting a very different mix of chemicals that aid our process.

P.S. Although a somewhat cheesy metaphor that Adam does not employ in this context, negatives are processed in a dark room, eh?

RADIO SHACK ON MARS

"When you're building something like an Entry, Descent, and Landing system to put a spacecraft on Mars, it's easy to devote all your attention to the "naughty bits," things like phenolic impregnated carbon ablators, Mach 2.25 disk-gap-band parachutes, and high-thrust, deep-throttling hydrazine monopropellant engines, the innovative, glamorous new designs that push the boundaries of the physical laws. And it's all too easy to completely ignore the more mundane elements that are just as essential. It pays to remember that you can have written the most sophisticated EDL software known to man, but all it takes to kill your billion-dollar project is failure in one component the likes of which you could have picked up at Radio Shack."

The naughty bits and the mundane. :)

Reminds me of John Wooden and his socks.

We've talked about it a number of times but let's not forget that the greatest coach e.v.e.r. started each season teaching his players how to put on their socks. Then he ran ONE defense, one offense and one out-of-bounds play.

Here's how [Andrew Hill](#) puts it in his business memoir *Be Quick But Don't Hurry* (see Notes) in which he reflects on his time with Wooden: *"There was no simpler program in America than UCLA in its heyday. We had one defense (man- to-man), one out-of-bounds play, a simple high-post offense, and the firm belief that a fifteen- foot bank shot at the end of a fast break was a fine result. Scouting UCLA was a waste of time; our opponents knew what we were going to do—they just couldn't stop it. Coach ran the exact same offense his entire coaching career, which spanned forty years, except for the six years in which he had the two greatest centers of all time. But without Kareem or Bill, the Bruins plays were so familiar that they were run by high school teams all over America. One clear by-product of the simplicity of the system is that it could be run to absolute perfection. In Coach's words, 'The more you make things complicated, the more there is to learn. Keep things as simple as you can and you have a chance to do them better. I'd always rather do a few things well.' We learned our lessons so well that when I played in an alumni game nearly fifteen years after I graduated, the plays were still completely fresh in my memory!"*

In my interview with time management guru [David Allen](#), he reminded us that one finds the sublime via the mundane.

In another interview with [Robin Sharma](#) he said that greatness is all about optimizing simplicity.

Basic routines and rituals. Turning off the Internet. Creating time blocks for deep work. Eating

"Our curious search for truth and understanding makes us unique compared with the other creatures on this planet. Our search drives strange behaviors, creates strange inventions, and appears crazy at times, but it just might be the right kind of crazy."

~ Adam Steltzner

well. Moving more. Sleeping better. Disciplining our minds.

Those aren't the naughty bits of life. They're more like a trip to Radio Shack. It's MUCH more interesting to talk about the latest and greatest Big Idea—which, of course, is awesome. But, if we want to get to Mars, we need to focus on the nuts and bolts as well.

You need to make a trip to the Radio Shack of optimizing? :)

BE CURIOUS

"We humans are an innately curious species. Born through hips too narrow to pass a skull large enough to hold a fully formed human brain, we are born half-baked. Compared with those of other animals, very few of our behaviors are hardwired. We don't inherit genetic instructions for nest building, for instance, or migrating south when the sun hits a certain angle in the sky. We come into this world programmed with few instructions, save for one paramount piece of code: Be curious."

We are born half-baked.

Reminds of [Rollo May](#)'s wisdom from [The Courage to Create](#) (see Notes) where he tells us: "*The acorn becomes an oak by means of automatic growth; no commitment is necessary. The kitten similarly becomes a cat on the basis of instinct. Nature and being are identical in creatures like them. But a man or woman becomes fully human only by his or her choices and his or her commitment to them. People attain worth and dignity by the multitude of decisions they make from day by day. These decisions require courage.*"

Here's to the courage to follow our curiosity in pursuit of the right kind of crazy!

B

Brian Johnson,
Chief Philosopher

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you'll probably like...

[A Mind for Numbers](#)

[Make It Stick](#)

[The Achievement Habit](#)

[The How of Happiness](#)

[Mastery](#)

About the Author of "The Right Kind of Crazy"

ADAM STELTZNER WITH WILLIAM PATRICK



Adam Steltzner is an engineer at the Jet Propulsion Laboratory. He worked on several flight projects, including *Galileo*, *Cassini*, *Mars Pathfinder*, and *Mars Exploration Rovers*. He was the phase lead and development manager of the *Mars Science Laboratory*, *Curiosity* rover EDL phase, and helped design, build, and test the sky crane landing system.



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Brian Johnson loves helping people optimize their lives as he studies, embodies and teaches the fundamentals of optimal living—integrating ancient wisdom + modern science + common sense + virtue + mastery + fun. Learn more and optimize your life at brianjohnson.me.