



Roel Snieder and
Jen Schneider

The Joy of
Science

Seven Principles for
Scientists Seeking
Happiness, Harmony,
and Success

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Seven Principles for Scientists
Seeking Happiness, Harmony,
and Success

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Preface

The idea for this book came out of the experience of working with the faculty, staff, and graduate student reading groups at the Colorado School of Mines (CSM), in Golden, Colorado. Organized by Roel, these groups began meeting in 2009, and functioned as a sort of academic “book club,” the aim of which was to provide our CSM colleagues with a venue for discussing interesting ideas and concepts related to working at the university. For example, one early text the group discussed was John Medina’s *Brain Rules*, which discussed novel and innovative ways to promote learning and productivity.

But a secondary outcome soon emerged – as the two of us participated in the groups, we noticed that they were meeting a need among faculty, staff, and students to build a community, a place where we could discuss ideas that were meaningful to us not just as employees but as whole people, humans who lived their lives through and beyond the walls of the institution. We read books and readings on topics ranging from spirituality to social justice to project management, and were edified by our colleagues’ commitment to showing up for sometimes difficult but often rewarding conversations about how to bring our whole selves into the workplace.

We also realized, however, that there were few books that addressed the specific concerns of scientists, social scientists, and engineers who wanted to better integrate their home and work lives, or who were struggling to feel both successful and joyful at work. In off-handed terms over lunchtime conversations, the two of us began discussing the possibility of creating a workbook for our reading groups that might offer helpful exercises and short readings for addressing the concerns of those trying to navigate their way through scientific or technical graduate programs, the tenure-track,



Janwillem Snieder (www.jwsnieder.nl)

or demanding academic and corporate careers in the sciences that seem to require ever more commitment and longer working hours.

As our discussions continued, we soon realized that a brief workbook wouldn't allow us to do what we really wanted to do, which was to describe the traits of those whom we believed were most successfully and joyfully integrating their work and personal lives. We noticed that the colleagues, mentors, students, and friends who most inspired us shared seven characteristics, traits, or practices that made them both effective and joyful in the workplace and beyond. Exploring these seven traits required a more sustained exploration, and the result of that exploration is this book. While working on this

project, we also had the opportunity to reflect on our own experiences, on reading we have done as “seekers” interested in untangling the puzzle of “work-life balance,” and on some of the academic research that has been published on this topic. We have tried to integrate these many pieces into an easily accessible format, one that will primarily appeal to academic scientists, engineers, and social scientists, but which may have broad appeal for any professionals seeking more joy in their lives.

As with any book-length project such as this one, many hands made the work possible. We are grateful to Matt Lloyd and Zoe Pruce at Cambridge University Press, and Ramya Ranganathan at Integra-PDY, for their support, enthusiasm, and guidance in shepherding this book from draft to physical artifact. Sara Kate Heukerott, Christoph Sens-Schönfelder, and Ken Lerner read early drafts of the manuscript and provided valuable feedback and encouragement. Rembrandt Zuijderhoudt was both an inspiration and a sounding board when this project was no more than an idea. Janwillem Snieder, Roel’s brother, graciously provided the delightful illustrations for the book. We have also both had wonderful mentors, teachers, and role models who have helped us personally to live more joyful professional lives, and who were our exemplars as we brainstormed the seven traits of the joyful, successful academic: Ken Lerner, Toni Lefton, Carl Mitcham, and Terry Young.

Several colleagues took valuable time at the end of a very busy semester to provide us with narratives of their own experiences – both good and bad – with integrating their work and home lives. We are incredibly grateful to them for their bravery and honesty, and their stories have made this book much richer. We are also lucky to have worked with many of them: Deserai Anderson Crow, Jason Delborne, Lejo Flores, Monica Hubbard, Ken Lerner, Jerry Schuster, Jon Sheiman, Evert Slob, Sven Treitel, and Terry Young.

Above all, we are grateful for our families. Roel is grateful for Idske for sharing her love and for living with a restless husband, and for Hylke, Hidde, and Julia for being wonderful adult friends. Jen wants to

thank Eric, who shows his support and love through countless gestures large and small, every day, and Addie and Nolie, who have made life better, richer, and more beautiful in all ways.

WE WOULD LIKE TO HEAR FROM YOU

Writing this book, and using it in our teaching, is an evolving project. We see this book as an exciting step in our own growth, and hope that this project leads to new initiatives such as lectures, workshops, or even another book. We would love to hear your reactions and suggestions, and hope you feel free to contact Roel (rsnieder@mines.edu) or Jen (jenschneider@boisestate.edu). We will post errata and other information related to the book, as well as the next steps that we will take, on the following website: www.mines.edu/~rsnieder/Joy_of_Science.html. Follow us on Facebook at www.facebook.com/ScienceHarmonySuccess/.

provides intellectual satisfaction, but also provides recognition, career opportunities, and possibly economic gain. In addition, scientific discoveries can be useful, which, in itself, is a satisfying reason to be a scientist. Scientific inquiry can help us to get a better grip on the world around us, and the discoveries of science have without a doubt shaped the world in myriad ways, from the introduction of drugs and treatments to cure diseases, to space exploration, to natural resource development, to the information revolution. One might view particular scientific endeavors with caution or delight, but it is hard to deny that science has shaped our material world. With modern instrumentation and dissemination of information, science has influenced the way in which we observe, understand, and experience the world, largely emphasizing the importance of data or objectivity in decision-making and policy.

A corollary to this objectivity, however, is that it may lead scientists to promote a purely mechanistic view of the world where only things that can be measured are considered to be real. This mechanistic view limits our abilities to interact with one another in satisfying ways. Addressing this limitation is one aim of our book.

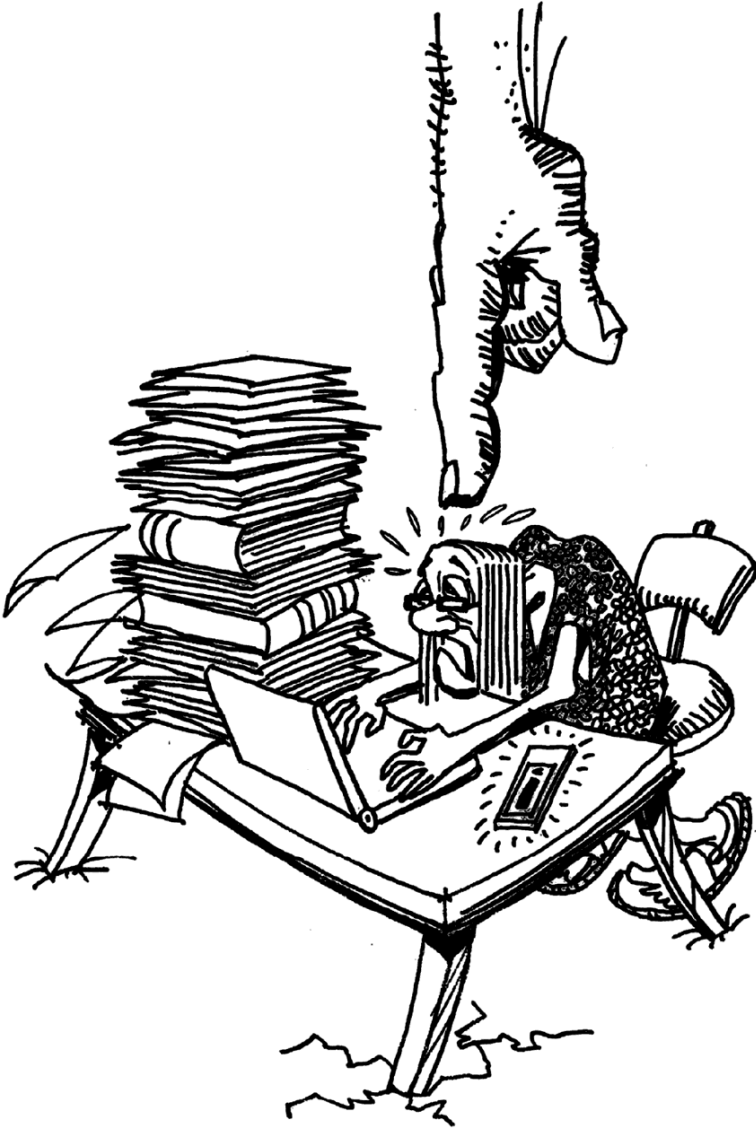
We also know that scientists are a trusted source of information. Despite the evidence that there is a “war on science” in the United States (Mooney, 2005; Oreskes & Conway, 2011) or that Americans seriously lack scientific literacy (Mooney & Kirshenbaum, 2010) many Americans still rank scientists very high on their list of trusted sources of information (Gauchat, 2012). Even given the prevailing stereotypes of the “mad scientist” (Frayling, 2005) going into scientific fields remains a respected career path, and one that is potentially financially rewarding as well. For many, therefore, becoming a scientist is something to aspire to. Books celebrating the activity of scientific research – such as an earlier book also titled *The Joy of Science* (Sindermann, 1985) and Barbara Minsker’s *The Joyful Professor* (2010) – are useful resources. Our work hopes to build on this earlier work by

emphasizing not just the practice of science, nor the science of time management, but by helping us to articulate and then construct professional and personal lives that are in harmony and bring us joy.

Some scientists are already living harmonious, joyful, and successful lives. If this describes you, bravo! However, we believe that for many young scientists – and even for some of us who are more experienced – this somewhat romantic image belies the reality. In fact, many scientists live under enormous pressure. There is the pressure to produce scientific papers, encapsulated by the common wisdom to “publish or perish.” There is the pressure to have a vocal presence at scientific meetings and to participate in committees and editorial boards. And for those in the academic community, there is the pressure to teach well, in addition to being innovative and productive in research.

Furthermore, many scientists view science as an activity that is inherently competitive. And there is indeed a competition to be the first to make a discovery, as there is pressure in acquiring research funding and job opportunities. These pressures, whether real or perceived, can be so large that the “joy of science” seemingly degenerates into the “survival of the fittest.” These pressures can be aggravated by the expectation that in addition to having a successful career, we should also have a healthy and rich personal life. That personal life may involve raising a family with two working parents, children, and/or aging parents or loved ones who depend on us. And this says nothing of time needed to maintain or improve one’s physical, mental, and even spiritual health. Trying to figure out how to make both professional and personal lives “work” puts an additional pressure on scientists, especially in the early stages of their careers.

But there is an even more insidious aspect to the pressure that many scientists feel, which is the commonly held belief that no matter how hard we work, *it is never enough*. Or perhaps we feel that *we* are never enough. No matter how many papers one



Working under the commonly held belief that no matter how hard we work, it is never enough.

might have written, one can always write more. Even though one may have attended many scientific conferences, there are always more meetings to attend, and there are always more committees and editorial boards one can serve on. There are more grants to secure and more students to graduate. To make matters worse, the metrics seem to be changing, workloads are increasing, and sometimes the resources we need to do our work diminish. What further drives this feeling of pressure is the common belief among scientists that to be useful it is necessary to be “the best.” This belief is often fueled in the formative years of graduate school by advisors who, often with the best intentions, want their advisees to be productive and shine in the scientific community. To achieve this, advisors sometimes push their students ceaselessly to do more. This notion may be fueled further by the tenure system at many universities in which it is impressed on tenure-track faculty that one has to be among the very best to receive tenure.

And – to articulate something that often goes unspoken – we also think it is possible that a number of seemingly successful scientists and other professionals bury themselves in their work because the other areas of their lives are not going so well. Perhaps one’s married life feels flat or unfulfilling or one can’t find a partner to spend time with. Perhaps the pressure of raising children or caring for aging parents is overwhelming or one has difficulty sustaining friendships. Turning our focus to work can distract us from these problems, and provide a sense of control that we lack elsewhere.

This depressing account of the pressures on young scientists may sound familiar to you. Indeed, when visiting academic departments or scientific conferences one does not gain the impression that scientists are particularly joyful. In his book *Don’t Be Such a Scientist*, former marine biologist-turned science communication expert Randy Olson (2009) writes that many scientists struggle to communicate both the outcomes of their research and their

passion for doing science. As a result they come across as dull or disinterested. Olson provocatively argues that scientists tend to live exclusively in their heads, rarely communicating from other parts of their bodies, such as the guts or heart:

The doing of science is the objective part. It's what scientists are most comfortable with. A scientist can sit in his or her laboratory all day long, talking to the microscopes and centrifuges, and they will never talk back. I have heard scientist friends of mine over the years rave about how much they enjoy field and laboratory research for exactly this reason – it's all so rational, so logical, so objective, and . . . alas, so nonhuman – a chance to get out in the field, away from people. No politics, no bureaucracy, no administrative duties, just pure rationality.

(Olson, 2009, p. 31)

Similarly, one of the colleagues we interviewed for this book noted that all kinds of academics – from novice graduate students to accomplished, tenured professors – can “get caught in the performance trap.” This trap leads one to believe that we are “defined by the recognition received in accordance with the academic lifestyle – the number of papers published, invited lectures given, research grants won, and awards received. But what happens when the music stops and the dance is over? Where does one then derive his/her sense of value or worth?”

This is exactly the question we are interested in. How does one find joy in and through one's work, but without sacrificing a sense of being a “whole person,” or falling victim to the “performance trap?”

JOY AND SUCCESS

The earlier portrait of the academic scientist's life raises the question: Can we experience joy in our laboratories, classrooms, and offices? Can we communicate and share that joy with others? What does it mean to be successful *and* joyful? To be even more philosophical, does *joy* matter in our work? If so, why?

This book is meant as a personal guide for developing a fulfilling and joyful career as a professional. It can serve that purpose only when used in a personal way; this book should not be seen as an academic treatise on the academic career. We ask the reader to answer the questions that follow before proceeding. This should not take much time. In fact, we recommend that you do this with little forethought; often our gut feelings and first reactions are more accurate than our well thought-out responses. But we do encourage you to *write down* your answers; it is otherwise too easy to skip over them or to get caught up in familiar internal chatter. In our experience, writing things down helps us to reveal our own thought processes to ourselves, to achieve specificity and clarity on our goals and desires, to question preconceived notions or misunderstandings, and to commit to new paths of action.

It is easy to over-analyze and over-rationalize, so we suggest that you take out a piece of paper to record your thoughts, write by hand (which might help you get out of your left brain), and give your intuitive reactions to the following questions:

- Are you fully and freely expressing yourself? What does this expression look like? How is it received by others? Or do you feel silenced sometimes? Do you find it difficult to say what you really think or feel?
- Do you think of the many parts of your life as being in balance, or in harmony? In what way? What would those closest to you say?
- Do you have personal or professional practices (e.g., carving out writing time, seeking feedback from mentors, meditation) that help you with your internal balance?
- Do you have any dreams in your personal or professional life you would like to fulfill? Or do you struggle to articulate a vision for your life, to explain where you would like to see yourself in five or ten years?

Perhaps all of the questions resonated with you; perhaps you felt a clear response to only one or two of them. That is all fine; there are no right or wrong answers to these questions. This is not a quiz or a test.



Perhaps there is a vague sense of unease with some of these questions.

The main point of this exercise is to get clarity on how you are doing. Perhaps you feel great or are doing great, but there is a good chance that there are areas where you feel some changes would benefit you. Perhaps there is a vague sense of unease with some of these questions. Think of these as pointers – messages from within – that are telling you that you might benefit from doing some things differently. This book serves as a guide to making changes in your life as a scientist that might lead to a more harmonious, less harried life, which we believe will also improve your effectiveness as a scientist.

ABOUT THIS BOOK

We refer to the audience of this book as “scientists” but really we have written this book for scientists, social scientists, and engineers who seek to have effective careers that are joyful and harmonious, and who hope to bring harmony to their daily lives in favor of a more peaceful way of living. We also have thought of our audience primarily as academics, because that is who we are, but we believe it’s possible that those outside of the university might also find this text useful. One of the points that we make in this book is that our character, personality, and outlook in life determine not only who we are in our



The authors enjoying commencement.

personal lives but our character and personality also influence our effectiveness as professionals. It really is a package deal; who we are determines how we lead our life, and this includes both our professional and personal lives.

You may be wondering at this point who *we* are, why we feel entitled to talk to you about joy, and why we wrote this book. As you move through these pages you will read more about us and our experiences – and about the experiences of other professionals we have interviewed. In the following, we provide a little bit of information about each of us.

Roel holds degrees in theoretical physics, atmospheric science, and geophysics. His research is diverse, but he gives most attention to imaging techniques, often in close collaboration with industry. He has published more than 260 papers, and this is his third book, his second on professional development for young researchers. Roel is also restless.

This explains his move from Europe to the United States, his frequent change of research focus, and the other activities in his life: between 2000 and 2014 he was a firefighter in addition to being a professor. But Roel also has an innate drive to find *meaning*. This resulted in his work on professional development that includes the courses “The Art of Science” and “Research Ethics” at the Colorado School of Mines. Combining all these activities has been a stretch at times. He considers himself a blessed person; he received a great education and has held good jobs, he was raised by loving parents, he has a loving wife who lives with his quirks, and he has three children. His students and children often think a crazy streak runs through Roel, but this is his way to compensate for a world that is often overly serious.

Jen, on the other hand, is a social scientist and humanities scholar who worked for many years with scientists and engineers at a small engineering college, where she gained tenure, and then made a cross-country move to become a tenured professor in a graduate program located in the city where she grew up. Her classes in policy and communication often take students far outside their comfort zones, because they are invited to use improvisational games, alternate presentation styles, and varied types of writing to think about research and communication in new ways. Jen’s academic work is primarily in the field of environmental communication, and much of her research examines the rhetoric of energy industries in light of environmental controversy. Jen is also a wife and mother of two, has a lot of hobbies and interests outside of work, and, at various times, has struggled to find harmony in her own life. Her desire to step out of the “stressed” life and into a more peaceful, joyful way of living has put her on a “seeker’s path” where she devours all kinds of readings and teachings about joy and success.

As you can see, we are quite different in our backgrounds and professional activities. Yet there is something that unites us; we both felt at some moment in our careers that we did not fit into a traditional “professor” or “scientist” mold; we felt a certain unease with the shape our professional lives had taken. For each of us that has meant making

fairly drastic changes that included, changing universities; emigration; innovating personal development programs at our universities; questioning the “way things are done”; and rethinking *how to be* with our coworkers, families, and friends. Both of us feel that these changes have enriched us. Out of these shared values grew the common wish to help young scientists develop effective and harmonious professional and personal lifestyles. We know from personal experience that making changes is not always easy, especially when the purpose of that change is not yet well defined. Over time both of us have stalled, struggled, and stumbled, and we still do so at times. So please don’t assume that we have figured it all out; developing a harmonious life is still a challenge that requires adjustment and practice for us, too. But our hope is that our experiences and seeking will help you to seek your own inner harmony, and to pass on that commitment to harmony to those you mentor.

Making changes in our life by just reading a “how-to” book is not realistic. In general, it is one thing to get insight into a condition, but making behavioral changes is much harder. Making such changes



Such changes can only be genuine and sustainable when they are congruent with your personality.

life. Integrity involves a steady focus on being honest with ourselves and others, even when that means being vulnerable, and on staying the course to do what needs to be done.

Addressing these traits and practices in our professional and personal life involves a personal commitment and active participation. As we stated earlier, this book should not be read as an academic treatise on the topic of career development or a how-to manual for addressing issues such as scheduling or promotion. In fact, thinking about these topics in a purely academic fashion can be counterproductive because the cloak of rationality can hide the feelings and intuition that are powerful drivers for how we think, feel, and behave. Instead, this book should be seen as an interactive text. For this reason, each chapter contains exercises. To get the most out of this book, we encourage you to do the exercises consistently – it can be helpful to have a notebook or journal that you write in as you read this book. We also believe strongly in the power of stories, or narratives, in making sense of life changes that we are trying to encourage. Therefore, in order to connect the material in this book with the lives of real scientists, we present in each chapter excerpts from interviews with scientists, social scientists, or engineers who have experience with the concepts we are examining.

I Harmony

You will never find your perfect life “balance” on the path [of life] for the same reason you will never find a unicorn on the path – because these things don’t exist. Forget unicorns and balance. If you were perfectly balanced, you’d never have to take anyone’s hand to steady yourself, and that would be a tragedy.

–Glennon Melton Doyle (2014)

THE LURE OF “BALANCE”

Many professionals, including scientists, find themselves wanting to “balance” professional and personal life. The pressure to excel, or be the best, can easily degenerate into a feeling that one can never work enough. The work atmosphere at different universities and other research organizations varies greatly, but there is frequently pressure to spend exceedingly long hours in the office and continue working at home. There is nothing wrong with working hard, but we also find that the temptation to work excessive hours – at the expense of other parts of our lives – is particularly strong for academics, for whom there are often no set work hours, and “deliverables” are never-ending. In the long run, however, such a lifestyle may come at the expense of our relationships, our peace of mind, and our health. Let’s not fool ourselves: both life experience and research suggest that overwork actually results in diminishing returns in terms of work productivity as well (Robinson S., 2012).

The “balance” between professional and personal life is particularly difficult for early-career scientists trying to prove themselves on the tenure track (Mason, Wolfinger, & Goulden, 2013). Just when learning curves and pressures are at their highest, these highly educated people may also be considering starting families, creating a perfect storm of demands and expectations. These years may be especially difficult for female scientists who often have the physical



A lifestyle of excessive work may come at the expense of our relationships.

experience of bearing and nursing children and, depending on their circumstances and relationships, may also find themselves responsible for a larger share of childcare and household duties. Scholars are careful to point out that our current academic system in the United States supports neither new mothers nor new fathers particularly well (Mason, Wolfinger, & Goulden, 2013) and there is the perception, if not the reality, that being on the "mommy track" is harmful to one's career. This disproportionately affects women and their choices to remain in academic positions as well as their ability or willingness to occupy advanced positions (such as achieving the rank of full professor or occupying leading administrative roles).

The question of balance, or lack thereof, also applies to research: Are we adventurous in our work or do we want to play it safe? Some research may be very original but have a high risk of never leading to anything useful, while other research could have a more or less predictable outcome, yet allow one to contribute to ongoing academic "conversations" only in modest ways. There thus exists a tension between doing very innovative research, with a relatively high likelihood of failure, and taking a less exciting and more certain approach. This tension plays out not only at the level of the individual scientist; federal and private funding agencies also struggle with this balance between innovation and

predictability of success. How easy it is to be out of balance in this tension: as a scientist one might only choose safe, but dull, topics of research, or one could focus exclusively on “pie in the sky research” that never goes anywhere.

There are other ways in which the scientific life could be said to be out of balance. Have you ever looked around you at a scientific conference or other gatherings of scientists, noticing what kinds of people are represented there and also who is *not*? Chances are high that most of those around you were male, and perhaps white males were in the majority. Despite many efforts, and a slow shift toward diversity over time, the scientific community in the United States is still not diverse; 2008 statistics show that whites still made up nearly 80 percent of those receiving doctorates in the sciences, engineering, and health (Milan & Hoffer, 2012). The statistical picture for American women is more complicated: women are well represented in some science and engineering disciplines, such as the biological sciences, but are poorly represented in others, such as physics, and in 2008 they earned 44 percent of US PhDs awarded in science and engineering (Rosser & Taylor, 2009).

While women in the United States are getting advanced degrees in science and engineering fields, that number drops significantly if we look at who continues into science and engineering careers, and numbers globally also show significant gender disparities for women, in both developed and developing countries (Women in Global Science and Technology, 2012). Why is it that women and minority groups are underrepresented? There are historical and social reasons for this, but decades of well-intended initiatives to diversify the scientific community have led to uneven or incremental improvements. As a result, the composition of the scientific community is out of balance. This leads to inequities for women and people of color, but research shows this lack of diversity might also not be good for white males or for science, either: a lack of diversity can lead to problematic practices such as “convenience sampling” and stifled innovation (Medin & Lee, 2012). Some researchers have