Five questions for Daniel Baker[1]
[2]

What would your life be like without the benefits that space and years of research affords us?

It's a question that Daniel Baker frequently asks in his role as director of the University of Colorado Boulder's Laboratory for Atmospheric and Space Physics (LASP).

Imagine a world without cell phones or TV or telecommunications. No Global Positioning System (GPS) to help get us safely to our destinations. No weather photos or forecasting equipment.

"Without those things, many would revert to a 'Stone Age existence' pretty quickly," Baker says.

Luckily, what we take for granted are the same things that Baker and his colleagues at LASP think about every day. The lab recently celebrated its 70th year of existence, but it is exceptional for more than its longevity.

"It's unique in the world, an extraordinary collection of people with all the skills necessary to carry out exciting research and engineering," says Baker, who has been directing LASP for more than two decades. "What keeps me here is the fact that I am constantly amazed, constantly surprised, constantly impressed with the ability of the team of people that we have put together to go far beyond the expectations – to do more than anyone thought we could do."

There have been times when the team was asked to have a mission payload ready in six months, instead of the usual timeline of two or three years. There have been missions when the team gave back money to the government, something that is almost unheard of in the aerospace industry, Baker says. Even though LASP had never specifically built high-energy particle detectors, and some expressed skepticism about the lab's plan to do it, the team built instruments that have "broken all the records. They have performed so beautifully and have revealed completely new things that haven't been known about the radiation environment around the Earth."

"It's because of the quality of the instruments," Baker says. "When the LASP team undertakes something, it is focused on one thing and that is scientific excellence."

Such drive begins at the top. Alongside his managerial duties, Baker continues his research in numerous areas and is a Distinguished Professor of planetary and space physics, professor of astrophysical and planetary sciences, professor of aerospace engineering, and professor of physics. He has earned numerous awards, most recently the American Geophysical Union's highest honor – the 2018 William Bowie Medal – which recognizes "outstanding contributions for fundamental geophysics and for unselfish cooperation in research."

1. How did you come to be at CU and how did you choose this career path?

I was recruited from NASA's Goddard Space Flight center where I was a laboratory chief. I was primarily recruited by a member of the LASP director search committee, the late Noel Hinners, who was vice president of Lockheed Martin Astronautics. I'd known him when he was director at Goddard. I came here to join the faculty, of course, but more specifically to take on the directorship of LASP.

Like most scientists, I was intrigued by science from my earliest years. I loved the act of learning. Early TV shows, like "Watch Mr. Wizard" and things like that, always intrigued me, but it was probably the prominence of NASA and space exploration in the '60s that really brought it home to me.

My mentor was James Van Allen (the namesake of the Van Allen radiation belts, zones of charged particles around the Earth). He got me involved in space research as an undergrad at the University of Iowa. Those students who did well in his class were invited to work in his group, and as an undergraduate, he asked me if I would like to build an instrument that was going to go to Jupiter. That was really exciting, and obviously, the answer to a question like that is, "Yes, you bet!"

I didn't know what my career path was going to be, but after my time at Caltech I went to work at the Los Alamos

National Lab and was group leader there for seven years, and then went to NASA. But I vowed even early on, when I worked for Van Allen, that if I ever had the chance to be at an academic institution, I'd really like to repay what he did for me. I wanted to make sure there were opportunities provided to students, especially undergraduate students, to get involved in space research. So it has come full circle.

LASP is perhaps one of the preeminent places to employ students and give them the chance to work, hands on, on real space programs, and I think it is one of our proudest aspects. We build things that go to space, and students are involved in all aspects of the mission, including operations and data collection. More and more organizations are attempting this, but they have not accomplished it nearly as well as I think we do here at the University of Colorado.

2. What is your role as director of LASP?

I would say I have many roles – providing vision, ultimately deciding what new things the lab is going to undertake, what changes we might be making in our direction, and providing top-level management and decision-making, which is crucial for LASP. And I also do personal research, which is in my genetic makeup. This is only possible because we have such an outstanding group of people here at LASP. They all are extraordinary. They could collectively suggest that I should stop doing research and just be a manager, but instead, they take on more of the responsibilities so that I'm able to do the kind of science and science writing that I really enjoy doing.

I try to be a great cheerleader for LASP and what we do, and I try to do that in the local Colorado region and on the national and international fronts. Much of what I do I would liken to conducting an orchestra. We have many individuals in science, engineering and management who are virtuosos in what they do. However, they have entered into something of a social contract we have here at LASP, and maybe subsume a little bit of their own individuality, to become part of what I think of as a remarkable orchestra that plays together so well. That is an important part of my job which is to provide the kind of guidance, vision and oversight that allows these outstanding individuals to work more collectively to accomplish amazing things.

When I became director of LASP, it was a much smaller, much different organization. LASP was known for some of its work in Earth and solar science, and it had become active in planetary science. By one measure, LASP has grown a lot, going from just a few teaching faculty to about 25 tenure-track faculty now. The staff has gone from fewer than 100 people to more than 600 people. We have about 100 undergraduates working at LASP at any one time, as well as about 60 or 70 graduate students.

More fundamentally, LASP has gone from largely measuring ultraviolet light from various objects – the sun, the planets and so on – to being a much broader, more capable lab in many different kinds of measurement techniques in space. We now are making measurements across all the wave lengths of light; we're making measurements of particles in space; we're probably the premier institute in the world when it comes to measuring properties of cosmic dust – the things that are left over from collisions between objects in space; and we are moving more toward working to understand not only the planets in our own solar system, but also planets around other stars.

I would say that LASP has become one of the preeminent institutes in the world for studying the effects of the space environment – what is called space weather – on human technology. We have been reviewed by a number of outside people and most assert that LASP is perhaps the preeminent university-related, space-research institute in the nation and possibly in the world. It makes us very proud that LASP has evolved so progressively over these past couple of decades and has become so prominent in so many different areas of engineering, science and technology.

Though I have been heavily involved in management since my Los Alamos National Laboratory days, I've always insisted that I would only take jobs if I could continue to do my own science research. Being active in research is essential for me, and I've published many scientific papers per year as an author or co-author, and I also present dozens of invited talks, mostly on scientific topics, in any one year. As I like to say, the first 40 hours a week are for the lab, and the second 40 hours a week are mine to do research. Clearly, scientific research is what motivates me, what stimulates my thinking. I don't feel that a scientific manager can be effective unless he or she knows about, and remains very heavily engaged in, what the organization really does.

3. One area of your research is space weather. What is space weather and how does it affect us?

Space weather is something that is crucial to our society. It takes advantage of the understanding we have of the sun, the space environment, the near-Earth environment, and so on. I've been blessed to be able to work on many different things, from basic space physics to plasma astrophysics, planetary exploration and national security space activities. But space weather is maybe the most important in a practical sense.

Space weather is essentially conditions on the sun and in near-Earth space that affect humans in space and technological systems in space and on Earth. Along with interruptions of communications and things like that, there can be severe effects on spacecraft operations and airline operations, navigation systems, and resource exploration communications. The threats to electric power systems are very substantial, and so space weather has become much more appreciated, in no small measure because of our efforts at LASP.

Policy makers have come to understand over the past 10 to 15 years that space weather is a real hazard to advanced nations such as our own. We've gone from this being some esoteric topic that very few people knew anything about to having space weather join the group of more appreciated hazards such as earthquakes and hurricanes. Policy makers recently have spoken about the need to take preventive measures and find mitigation strategies, and to make the technology systems more robust to the effects of space weather.

Space weather is not just a United States problem, it is a world problem. Understanding the disturbances on the sun and how they operate in a basic astrophysical sense is fascinating, but we need to be able to take that understanding and make it practical and useful for societal needs. That is our goal and we are moving forward. There are, however, many challenges that remain.

Our goal is to have observing platforms in space and on the ground that can provide enough information to make accurate forecasts about the sun's activities. We know that the sun undergoes an 11-year activity cycle where it becomes more active for several years and then that activity wanes. We know that the disturbances that cause the biggest effects are related to powerful, emerging magnetic fields on the sun. A lot of the things we study are closely related to those disturbances so that we can reduce the danger or the economic impact of these kinds of major space weather events. I think we are moving forward on this, but we are probably some decades behind where we are in our ability to forecast terrestrial weather events.

4. How does LASP earn participation in missions? Do NASA or other agencies reach out to you, or do you submit proposals to these entities?

LASP is specifically sought out more and more, but we of course submit proposals, too. First and foremost, LASP and the people here are regarded as thought-leaders, and we help NASA and other agencies think about what ought to be done. In the space community, there needs to be a consensus about the most important issues or problems that should be addressed.

Helping to make sure that those questions are formulated well is something that especially our senior scientists get quite involved with on the national and international level. Then program plans are put together by NASA or other agencies, and the agency issues an announcement of opportunity. This will call for ideas of how to address the questions. This is one of the principal ways over the years that LASP has gotten missions, by responding to those announcements and coming up with the most creative, the most novel, and often the lowest-cost way to address a key question.

LASP has been involved in dozens and dozens of different missions. We may have more than 100 active individual research projects ongoing at one time. Aerospace companies often come to LASP and want us to be involved with them. Ball Aerospace, which was founded by some LASP engineers who spun off in the 1950s, is one example. We continue to work closely with Ball Aerospace and Lockheed Martin, Sierra Nevada and many other companies. When they need scientific involvement or engineering involvement or operational capabilities, often they come to us. More agencies and non-governmental organizations, and even foreign entities, are beating a path to LASP's door because of the lab's successes and the vast knowledge base that we have.

(For a rundown of some of LASP's missions, visit its website at http://lasp.colorado.edu/home/missions-projects/[3])

5. What do you consider the biggest threat from space we face? What do you think is the biggest benefit we can potentially glean from space exploration/research?

I would say that the most likely threat from space is the one we've talked about previously: space weather. It's not a question of if, but when, we are going to have highly damaging coronal mass ejections (as they are called). I wrote a paper about this in 2013. We narrowly averted an event of such a huge magnitude in 2012. Had it occurred just a week earlier, we would have been in the line of fire from that solar disturbance, and I have suggested that we still would be picking up the pieces technologically.

We happen to be in a relatively weak solar activity period right now, but I can say with complete confidence that over the next decade or two, the sun is going to become much more active, and space weather will be a much bigger threat.

There certainly are other space concerns. A killer asteroid, for instance. It would be a bad day for the entire planet if a large body were to hit the Earth's atmosphere à la 65 million years ago, but the probability of such an event is much lower than severe space weather and we are now more aware of what the large threatening asteroids are. Of course, what we would do about an approaching bolide is another question.

I also have real concerns that space is going from a rather scientific realm to being more weaponized and more of a theater of possible conflicts. I think it is really important for us as university people to try to establish deep policy thought about how to avoid the militarization of space more than it already is. How can we make sure that space remains a relatively pristine scientific arena?

The benefits of space exploration speak for themselves. If one goes back to the beginning of the Space Age in the 1950s, there was little reliance on space. By the 1960s, the benefits began to be more evident, and this has escalated tremendously every decade thereafter. Space has become more and more built into people's lives.

When I give public talks, I ask people to think about "a day without space." What if you didn't have the Global Positioning System (GPS), television or radio communication, navigation capabilities, weather photos and all the knowledge that systems from space give us each day? Space is intrinsic to our daily lives and it is only going to become more so. When you start to conflate that with the threats to those systems, you realize that space benefits and space threats have to go hand in hand. We need to think carefully about the kind of dependences we are building on these systems and how vulnerable they might be to disruption, either by human or natural causes.

DAWN Clinic expands its impact and partnerships[4]

CU Innovation and Efficiency Awards: A winning orientation[5]
[6]

Employee-designed improvements in a variety of areas – business, finance, environmental, research, and humanitarian – inspired attendees at the annual CU Innovation and Efficiency Awards Expo.

The 2019 program's 10 finalists showcased their diverse, wide-ranging array of submissions May 7 at 1800 Grant St.

Developing the UCCS Mobile Orientation App took first place and the $1,500 University Controller's Award for Excellence. Hailey Santonastaso, UCCS orientation program coordinator, and Nick Lockwood, director of orientation and new student outreach, noticed that new students were heavily reliant on their phones, and deduced that a mobile app might be a more accessible way to guide new students through the orientation process. Their experiment proved quite successful, both for the students and for Hailey and Nick.

Other award-winning submissions were:

Commercial Paper to Fund Construction Projects – Treasurer Dan Wilson, Associate Treasurer Charles Cook and Associate Director of Treasury Michelle Travis reduced the dollar amount and cost of CU's long-term borrowings by taking advantage of lower-interest commercial paper to finance the initial phases of construction. They estimate that this use of commercial paper has reduced overall borrowing by $5 million to $8 million per $100 million borrowed for university capital construction projects.

Advancing Scholarship Through an In-House Research Support Center – With financial support from Douglas Novins, director of the Division of Child and Adolescent Psychiatry, employees of the Department of Psychiatry – including Merlin Ariefdjohan, Emmaly Perks and Melissa Sinclair – improved morale and promoted the research efforts of early career clinical faculty by establishing an in-house research support center dedicated to assisting with research design, development and coordination for these overburdened faculty/clinicians.

CU Non-Employee Reimbursements – A collaborative effort among employees from the Office of University Controller, UIS and the Procurement Service Center (Cal Anderson, Linda Warren, Adam Rodriguez and Jaime Mendez) resulted in an automated process for reimbursing non-employees that significantly reduced paperwork, processing time and administrative burden.

Autoclave Program for Managing Biohazardous Waste – Past CU Innovation and Efficiency winners Denise Donnelly and Mark Garcia from the CU Denver biological waste management team continued their award-winning efforts at improving sustainability and reducing costs with their new program for treating biohazardous waste using existing campus autoclaves.

Five other groups or individuals with meritorious submissions made it to the finals and received recognition at the expo this year. They were:

Nick Lockwood, Greg Williams and Koroush Iranpanah of UCCS, who conducted a thorough analysis of available technology to find the perfect tool (Chromebooks) to speed up the student registration and orientation process on campus, resulting in time saved for students and staff, as well as significant cost reductions all-around.

UCCS Wellness Center employees Melissa Kuykendall and Chrissie Bailey, who employed a new software (Medicat) system to simplify and expedite the process for collecting and loading student immunization records into the campus medical systems.

System employees Cal Anderson, Linda Warren, Brad Rieke and CU Denver asset accountant Tom Johnston, who combined efforts to develop a previously unused PeopleSoft module into a centralized asset inventory management system that all CU campuses can use to record and track capital assets.

CU Denver research assistant Coby Wikselaar, program assistant Kelly Stritzinger and Tony Robinson, chair of the CU Denver political science department, who conceived of the much-admired Student Hunger and Homelessness Initiative, which raises awareness of homelessness and hunger on the Auraria Campus and works to alleviate those issues.

Mariana Vieira, a laboratory coordinator on the CU Boulder campus, who created a "green darkroom" by identifying and purchasing more environmentally friendly chemicals and taking meaningful steps to reduce water usage in the Visual Arts Complex photography lab.

The display of creativity and ingenuity at this year's expo was truly impressive, and it was exciting to be a part of it all. Kudos go out to all 10 finalists and to the other 10 teams or individuals who submitted ideas in the 2019 program year. We appreciate your participation, we admire your dedication and we thank you all for making CU a better place to work and study.

If you couldn't make the expo, we invite you to share in the inspiration by viewing all of our 2019 submissions

at https://www.cu.edu/controller/i-e-awards/cu-innovation-efficiency-awards-current-submissions[7] .

We hope to hear from you next year!
Submitted by Fran Chapman, Office of University Controller

Crisis relief is only a phone call away with Real Help Hotline[8]
[9]

In life, there are highs and lows. Some are big and others small. If you reach a point where you're feeling overwhelmed by the stress in your life – whether it's related to finances, relationships or any other issue – there's help through the Real Help hotline[10].

The phone service – (833) 533-CHAT (2428) – provides all CU employees with access to professional counselors who offer assistance finding wellness and behavioral health resources or immediate counseling. Whether callers are experiencing a serious crisis or just need recommendations for when life gets too stressful, Real Help is here.

Counselors can provide information on safety, emergency financial and legal resources. The hotline is free, confidential and available 24/7.

The best part: The CU Health Plan's hotline affiliation means counselors can direct callers to services and behavioral health providers covered by CU's health plans. They can recommend CU Health Plan wellness programs that may help employees deal with situations including the Employee Assistance Programs (EAP), Move, Silver Sneakers and many others. Any CU employee, regardless of health coverage, can receive assistance and referrals to the appropriate care.

"The Real Help hotline is an initial step toward providing members of the CU community with integrated resources and access to multi-level mental health care," said Gena Trujillo, assistant vice president and operations officer at CU Health Plan administration.

Not sure when to call? Here are the top five reasons people called in April 2019:
Anxiety "Major life stressors" Mood concern(s) Safety concerns/suicidal ideation Family issues
Calls are not limited to your personal needs. If you have concerns about others, Real Help is there – 8% of calls are people calling in concern about others, most often a dependent. Dependents of CU Health Plan members can also use the service.

"Everything with this service was designed from the start to be convenient and accessible for every employee," said Josh Larson, MA, LPC, Rocky Mountain Crisis Partner's clinical operations and quality assurance specialist. "While our crisis clinicians and triage specialists are not benefits counselors, they can direct employees to local resources and referrals, and provide crisis-focused mental health support 24/7."

If you, a co-worker or a family member needs assistance, the number to call is (833) 533-CHAT (2428).

New CU Boulder building to connect business, engineering in novel ways and honor alumnus and donor [11]

Pac-12 announces early season, weeknight game times, TV [12]

The CU scientist cracking the love code[13]

Chancellor visit with Denver alumni and advocates highlights latest campus initiatives[14]

Cycling lanes, not cyclists, lower road fatalities[15]

CU School of Medicine partners with CSU to open medical school branch[16]

Mays named chair of the Department of Health Systems, Management and Policy[17]

84 staff members recognized with service awards in annual luncheon[18]

Kiser honored by Women in STEM as outstanding professor[19]
[20]

Jennifer Kiser, associate professor at the School of Pharmacy, recently was honored with the Outstanding Women in STEM Professor Award.

Kiser was among the winners chosen for the inaugural awards from the CU Anschutz Women in STEM[21]. The Outstanding WiSTEM Professor Award was created to recognize and amplify the efforts of professors that aren't necessarily quantified in research dollars.

Links
[1] https://connections.cu.edu/spotlights/five-questions-daniel-baker[2] https://connections.cu.edu/sites/default/files/baker_01.jpg[3] http://lasp.colorado.edu/home/missions-projects/[4] https://connections.cu.edu/stories/dawn-clinic-expands-its-impact-and-partnerships[5] https://connections.cu.edu/stories/cu-innovation-and-efficiency-awards-winning-orientation[6] https://connections.cu.edu/sites/default/files/innovation_top_0.jpg[7] https://www.cu.edu/controller/i-e-awards/cu-innovation-efficiency-awards-current-submissions[8] https://connections.cu.edu/stories/crisis-relief-only-phone-call-away-real-help-hotline[9] https://connections.cu.edu/sites/default/files/helpline_feat.jpg[10]

https://www.becolorado.org/program/the-real-help-hotline/[11] https://connections.cu.edu/stories/new-cu-boulder-building-connect-business-engineering-novel-ways-and-honor-alumnus-and-donor[12] https://connections.cu.edu/stories/pac-12-announces-early-season-weeknight-game-times-tv[13] https://connections.cu.edu/stories/cu-scientist-cracking-love-code[14] https://connections.cu.edu/stories/chancellor-visit-denver-alumni-and-advocates-highlights-latest-campus-initiatives[15] https://connections.cu.edu/stories/cycling-lanes-not-cyclists-lower-road-fatalities[16] https://connections.cu.edu/stories/cu-school-medicine-partners-csu-open-medical-school-branch[17] https://connections.cu.edu/people/mays-named-chair-department-health-systems-management-and-policy-0[18] https://connections.cu.edu/people/84-staff-members-recognized-service-awards-annual-luncheon[19] https://connections.cu.edu/people/kiser-honored-women-stem-outstanding-professor[20] https://connections.cu.edu/sites/default/files/p_kiser_01.png[21] https://amcwistem.com/