Spotlight on Dr. Clemens Rumpf

His research is straight out of an action movie where a life-threatening object is plummeting toward Earth and the superhero swoops in and stops it or shoves it off course, redirecting it to the ocean or somewhere in outer space.

“If we see an asteroid before it impacts, we can conceptually come up with a space mission to go to the asteroid and change its trajectory,” said Dr. Clemens Rumpf from Ames Research Center, “Instead of it hitting the Earth it flies past the Earth. We can turn this natural disaster into a complete non-event.”

TWO SIDES OF THE STORY

His research addresses the Asteroid Impact Hazard, which looks at asteroids traveling through space and hitting the Earth. This is much more common than you might think. Shooting stars are asteroids, and there are hundreds of them each night. Rumpf’s research is focused on the bigger ones ranked higher on the Torino Impact Hazard Scale which categorizes potential Earth impact events ranging from 0 to 10 with color coding that communicates the consequences of a potential impact event. The higher the number, the more extraordinary the event. For example, an eight on the Torino scale estimates certain collision with Earth causing localized destruction for an impact over land or possibly a tsunami if close offshore. However, the Torino scale addresses the other side of the coin. “Such events occur on average between once per 50 years and once per several 1,000 years.” (Center for Near Earth Object Studies). So, while asteroids have the potential to be catastrophic, the major ones occur very infrequently.

Written by: Samantha Mason

Continued on page 3
Unconscious Bias in Hiring, Promotions, and Tenure
Written by: Joan Schmelz
We all have biases, and we are—for the most part—unaware of them:
- men and women both unconsciously devalue the contributions of women;
- whites and people of color both devalue the contributions of people of color.
It is important to understand that unconscious bias is fundamentally different from discrimination or prejudice. It can have a detrimental effect on job/fellowship applications, proposal/performance reviews, award nominations, and promotions. In short, it comes into play any time we are evaluated.

BACKGROUND
Sociology is way ahead of the rest of academia in these studies. For example, when evaluating identical application packages, both male and female university psychology professors preferred 2:1 to hire “Brian” over “Karen” as an assistant professor. When evaluating a more experienced record, at the point of promotion to tenure, reservations were expressed four times more often about Karen than about Brian. Thus, unconscious bias has a repeated negative effect on Karen’s career (Steinpreis, Anders & Ritzke 1999, Sex Roles, 41, 509).

MY STORY
Years ago, before I ever heard of unconscious bias, I was reviewing a set of NASA proposals. The proposals were printed on paper and delivered by FedEx (yes, practically the Dark Ages!).
My habit was to go through one proposal per day, writing notes in the margins and giving each a preliminary score. Days and days went by, and when I finally finished, I happened to stack up the proposals on my desk in order of the preliminary score. As I leafed through them, I noticed something that I had not expected—the two proposals with women principal investigators were at the bottom of the pile with the lowest scores.
I forced myself to go through the proposals again, reading all my comments and thinking about how these proposals stacked up against the others. I found that I could not justify my original low ratings and adjusted my scores accordingly. I did the same thing for the other proposals, but those scores did not change. At the end of the process, these two proposals from the women were now in the mix. What had just happened? I now know that this was my own unconscious bias at work.

WHY?
People often ask me why we have these unconscious biases about women, about people of color, about everyone in marginalized groups. The “simple” answer is that we have lived under a patriarchal social system for over 10,000 years! Everyone you have ever met and practically everyone you have ever heard of is the product of patriarchy. With that kind of social engineering dominating every aspect of our lives for countless generations, it is no wonder that these biases have worked their way into our psyche.

BE THE CHANGE
The good news is that we are on the road to eliminating unconscious bias. That process begins with awareness, then moves to policy and practice, and ends with accountability. If you want to know more about unconscious bias, or think you couldn’t possibly be biased, try taking the Harvard Implicit Association Test (Instructions: Scroll down. Click “I wish to proceed.” Select “Gender – Science IAT.” Instruction will pop up. Click to begin.)
The views, thoughts, and opinions expressed in this article belong solely to the author.
Spotlight on Dr. Clemens Rumpf

PREDICTABLE

According to Rumpf, an asteroid impact is a natural disaster, but stands out due to its predictability in terms of location, time and consequences.

“If you compare them to other natural disasters, they are really unique,” explained Rumpf. “The community has the ability to predict 100 years into the future and get a really good location and time of a possible impact. If you think of earthquakes, nobody can predict when and where the next earthquake is going to happen.”

With the tools he developed during his PhD, and those that he is now developing as part of the Asteroid Threat Assessment Project (ATAP) team at NASA Ames, Rumpf and team can predict what the damage would be in an asteroid impact scenario.

“When we [the greater community] discover an asteroid,” said Rumpf, “we measure the orbit and then we need tools that predict the impact location, the time and the consequence. That is what we are working on here. This effort is maybe four years old. The new aspect that I am focusing on is combining a few different disciplines. So we have the consequence calculation that the team here has been leading, we have an impact location, we know how big the asteroid might be, we know the incoming trajectory and we can then calculate how many people would be affected by an asteroid impact.

PREVENTABLE

Another aspect is the impact’s preventability. The defection missions involve a spacecraft going to the asteroid and starting to push it and change its trajectory.

“In my analysis we do the consequence calculation, but then I also incorporate the defection mission,” says Rumpf. “That’s work that to my knowledge no one else has done before. We try to figure out how the asteroid’s impact risk changes when deflection missions enter the picture.”

LIMITS

The elements of predictability and preventability only apply to known asteroids. At this time, less than one percent of potentially dangerous asteroids are known, but Rumpf is optimistic as the catalogs on known asteroids are steadily increasing. We also learn more about the physical process of real impacts thanks in large part to an instrument called the Geostationary Lightning Mapper on two of the National Oceanic and Atmospheric Administration’s (NOAA’s) Geostationary Operational Environmental Satellites, GOES-16 and GOES-17. Taking 500 images of Earth every second and calibrated to capture flashes that are slightly brighter than the full moon, the instruments capture asteroids colliding with the Earth at 100,000 mph and exploding in the atmosphere as they burn up.

“For the purposes of the instrument, which is intended to detect lightning, this is like noise, but for us this is valuable information,” says Rumpf. “We are seeing multiple instance of asteroids burning up in the atmosphere in the data. This will be a wealth of information that comes our way, and to the community in general, in terms of measured impact process data, both in quantity and also in getting scientific data that will help analyze this phenomenon going forward.”

FREE TIME

When he’s not in the office, you can find Rumpf outside in the water or the air.

During the week, he and his wife practice paragliding. He is a long-time sailor and can be found in the bay on the weekends practicing or out in the ocean for a race.

“It’s a high stress situation,” says Rumpf, “but it’s so much fun when it works, and people work together.

“Flying has also been a big part of my life. I started flying when I was 13. At that time, I was back in Germany. I would take bicycle rides 15 kilometers one way to a local sailplane airport and push planes all day long. At the end of the day they might give me a short flight in a double seat airplane. That started when I was really young. Then I

joined the club and got a pilot’s license at a young age and have been flying ever since.

THE NASA EXPERIENCE

“One great part about being out here at NASA Ames is the people. First, I want to thank my manager, Donovan Mathias, for the opportunity to be here. Adding to that, especially some more senior colleagues here have been so great, not only in a work-related way but in a personal way as well. They have made the experience fun. That has been actually a big part of my experience that I wouldn’t want to miss.”
The results of new research on Volcanic Smoke Rings led by Dr. Fabio Pulvirenti, Senior NPP Fellow in the Earth Surface and Interior Group, Earth Science Section at JPL, has been featured on National Geographic. By using advanced numerical modeling techniques and data from observations, Dr. Pulvirenti and his collaborators were able to show that the occurrence of volcanic rings is related to fast degassing and to the geometrical shape of the vent that produces them. The research is the first of its kind and helps us to better understand the dynamic processes of volcano upper conduit systems.

Dr. Michael Thorpe was part of a team of scientists and engineers who successfully conducted a three week field campaign in south-central Iceland. The project, titled Semi-Autonomous Navigation for Detrital Environments (SAND-E), targeted fluvial and aeolian sediments in basaltic terrains, ultimately serving as a terrestrial analog for ancient sedimentary environments of Mars.

Robert Emberson visited Cox's Bazar, in Bangladesh, to present landslide hazard and risk models to UN humanitarian stakeholders charged with managing the Rohingya refugee camps. The maps developed as part of the NPP project are currently in use to help aid decisions about natural hazards that affect around 1 million extremely vulnerable refugees.

Christina Johnson has just started her research developing microgreens as a crop for spaceflight at NASA’s Kennedy Space Center in Florida, with Ray Wheeler. In early October, she visited their collaborators Sunny Luo and Tianbao Yang at ARS USDA in Beltsville, Maryland. There she learned about the methods that they have used to grow microgreens for their research. Johnson is excited to be a part of this collaboration between NASA and the USDA.

Michael Thorpe investigates the Langjökull glacial outwash.
What does the award mean to you?
I feel honored to be receiving this award and to be in the company of a number of colleagues across NASA, NOAA, and other agencies whose research I really admire. It's also intimidating to think about how to live up to the high expectations that come along with the award (and the grant money).

How did you find out you won?
I had just gotten into work and was walking down the hall checking my email on my phone (a bad habit). Our communications team had sent an email forwarding a copy of the White House press release from the day before with a congratulatory note. It was certainly a (nice) surprise.

How did you get from NPP to your current position?
I started as an NPP fellow in the Aerosol Research Group at Langley in January 2012, which was just a month after defending my dissertation. Our group studies the atmospheric abundance and properties of aerosol particles, and their role in cloud formation using laboratory instruments installed on NASA's aircraft. As an NPP fellow I was actively involved in designing and integrating the instrument payload, in addition to flying on the airplane and analyzing the data - very similar to my day job now as a NASA civil servant [at Langley Research Center]. Going from NPP to my current position required a lot of hard work, but also quite a bit of luck. A position in our branch opened up as I was wrapping up the 2nd year of my postdoc, and I submitted my resume for consideration. While I thought that I'd be a great candidate, I later found out that the computer algorithm doing the first cut of applicants obviously disagreed. The problem was that I had formatted my resume in the style of terse bullet points favored by human evaluators, rather than a more verbose, narrative format that would be more successful with a computerized keyword-matching program. Fortunately, I had another year to go as an NPP to keep working with the NASA team and wait hopefully for another opening. Luckily, another chance arrived several months later with a position in the lidar branch that I applied for and was ultimately successful in getting. Looking back now, I'm glad that things worked out as they

From the White House: NPP Alumni on Top
Meet four Presidential Early Career Award for Scientists and Engineers (PECASE) winners

The President announced the recipients of the (PECASE) on July 2, 2019. We heard some familiar names and were able to catch up with the NPP Alumni award recipients to get their take on receiving the award and valuable advice for current fellows. The PECASE is the highest honor bestowed by the United States Government to outstanding scientists and engineers who are beginning their independent research careers and show exceptional promise for leadership in science and technology.
Did NPP play a role in winning the award? If so, how?
Absolutely! NPP played a big role in both my professional development and in laying the groundwork for my current job and the research that garnered the PECASE recognition. I left grad school (like many people, I think) with an extremely deep level of expertise in a highly specialized area. My NPP experience was instrumental in getting me to think bigger and broader, as well as giving me the resources to travel and make connections with national and international colleagues. The NPP also introduced me to a variety of mentors and role models whose professionalism and approach to research really helped to hone my own work.

What career lessons/advice would you share with current postdocs?

Some of the best advice that I’ve received in thinking about what comes next after grad school, NPP, or whatever, is to not focus on a specific job or position that I think I want, but rather to envision what I want my life and day-to-day schedule to look like in 5 or 10 years and work toward that goal. Am I working 40-hour weeks or 60-hour weeks? Do I want to be doing experiments in a laboratory setting, writing research proposals for grant money for others to execute, or weighing in on regulatory and public policy? Am I wearing a suit or blue jeans? Money, time away from home, travel, and weekend work are also important to consider as well. While it can be easy to get locked into wanting a specific career trajectory, having a Ph.D. combined with the bonafides of a NASA Fellowship open up a lot of really exciting opportunities across the private sector, academia, and in government. Look for a career that matches your ideal lifestyle rather than comprising your lifestyle goals to match your career.

What do you know now that you wish you had known during your fellowship?

Don’t leave any of that travel money on the table and think strategically about how you can leverage those funds to broaden your expertise and build collaborative connections. Some of the most productive conferences that I attended as an NPP fellow were those that were a little outside of my area of expertise and where I wasn’t presenting anything. Also, make an effort to lean on those around you (not just your advisor) to develop new skills (instruments, models, computer languages).

Other thoughts/comments career advice?
I think NASA is a really exciting place to work with both the ability to do ‘big science’ and to interact with some amazingly talented researchers! Look for opportunities to contribute at the interface between research areas, where interdisciplinary work can be even more transformative (and where a future job opening might come from). In addition to coming up with your own ideas, also don’t be afraid to ask for advice. I’ve found that I and most of my colleagues have a list of ideas and projects that we’d love to do ‘if only we had the time’, but on which we’d be happy to collaborate with the NPP fellow down the hall if she brings hard work and enthusiasm.

Laurie Barge

How did you find out you won?
I got an email from NASA, sent to all NASA award recipients, saying we had been selected for the award. And inviting us to the ceremony in DC only a couple of weeks later. It was a total surprise, since it had been several years since I was nominated.

How did you get from NPP to your current position?
I was an NPP through the Astrobiology program but located at JPL, and now I am a JPL research scientist. Working at JPL was always my goal, which was why I did my NPP there. While I was an NPP I networked with lots of people at my center to find out how to get hired, and different ways I could build a career at JPL. Meanwhile I also wrote lots of proposals since those can also pay a part of my salary. Many of the proposals were rejected, but one was eventually funded and that was a big help in getting hired.

Did NPP play a role in winning the PECASE award? If so, how?
Yes, the research I did for the award was partly supported by my NPP fellowship. (I was awarded for the 2015 cycle, which is the year I transitioned from postdoc to full time research scientist).

What career lessons/advice would you share with current postdocs?

1) Learn how to write proposals now. It takes years to get good at proposal writing and is one of the most important skills a scientist can have – so practice as a postdoc when the stakes are lower. Related: serve on proposal review panels, as often as possible. Even if it’s not your exact expertise.

2) Networking is super important. Most of my funded projects in my early career, are with collaborators I built relationships with when I was a postdoc. The NPP provided generous travel funds, and I used them to not just go to conferences but also visit places to give talks, to build new connections with institutes / people I needed to, etc.

3) Postdocs can also be mentors to students. I had a lot of student interns throughout my postdoc years and refining my mentoring techniques and learning how to lead a research group was a crucial skill for when I was hired.

4) Seek out multiple career mentors (at your center, in your city) and meet with them regularly; you don’t know yet what opportunities are out there.

5) Use these postdoc years to get very good at public speaking. I gave 30+ talks as a postdoc many just for the practice, and it has been a huge help to
my career to have that skill. (Your network and your NASA center can help you find opportunities, and it’s also a great chance to do out reach!)

**What do you know now that you wish you had known during your fellowship?**

How important it is to think big and just try to do things, even if they seem out of my league. I didn’t even try for some opportunities early on as a postdoc because “I don’t have enough experience” or whatever. When actually the top performers are always trying these things, to gain that experience, and I could have done them too (and later I did, and it was fine and I wished I’d tried sooner!)

**What does the award mean to you?**

I feel honored and humbled to have won it alongside other colleagues who I respect and admire. I also admittedly still feel some imposter syndrome about it since these seem like big shoes to fill! I’m hoping I can use the prize money to do some good.

**How did you find out you won?**

As I was heading out to work, I vaguely saw some chatter about it on the Slack chat platform that one of the teams I’m on uses, but what people were talking about didn’t register until I stopped at a gas station on the way to work and read the messages on my phone. It felt pretty surreal. I had just bought a house two days prior, so the first few days of July were quite an eventful time!

**How did you get from NPP to your current position?**

My NPP started in September 2016, and I was ecstatic about the opportunity it gave me to go work at Goddard. I wanted to be at Goddard in particular because I’d previously spent a few months there as a grad student, and that experience got me excited about all of the research and mission development this NASA center has going on. My NPP was about modeling exoplanet atmospheres and their spectral observables. A civil servant job ad opened up shortly after I started the NPP position (in November 2016) when Goddard was in the midst of a cluster of exoplanet hires, and I was encouraged to apply for it. I got the job, and I transitioned to a civil servant in January 2017, just a few months after starting my NPP!

**Did NPP play a role in winning the award? If so, how?**

I am still so grateful for the opportunity my NPP gave me as it put me in just the right place at the right time with the right skill set for the types of civil servant hires Goddard wanted. During my NPP, I started to get significantly involved in the development of the Large UV Optical Infrared surveyor (LUVOIR) telescope concept, and I had the opportunity to travel to various conferences and workshops. All of this was fantastically useful, and I got much more deeply involved with LUVOIR once I transitioned to my current position.

**What career lessons/advice would you share with current postdocs?**

NASA centers are fantastic places to get experience with mission development. If this is something you’re interested in, there are so many opportunities to get involved, so ask around. Also, don’t underestimate the value of networking! Another huge lesson is learning when to say “no.” For a long time, I said “yes” to just about every opportunity or request that arrived on my doorstep. I think this was initially really helpful for me, but I’m still trying to learn when I need to say “no” to things. Even now, I usually feel guilty when I turn down opportunities, but I’ve also realized it’s incredibly important to give yourself permission to turn things down when you need to. There are only so many days in a month and only so many hours in a day.

**What do you know now that you wish you had known during your fellowship?**

At least for me, it was much easier to protect my personal research time when I was a postdoc compared to now that I’m a civil servant. I’m involved with really exciting and big projects now.
Awards

International Association of Cryospheric Sciences 2018 Early Career Scientist Award
Denis Felikson
Goddard Space Flight Center
Advisor: Sophie Nowicki

Denis Felikson received the International Association of Cryospheric Sciences 2018 Early Career Scientist Award, presented during the International Union of Geodesy and Geophysics General Assembly, held in Montreal, Canada in July 2019. The award is given every other year to two early career scientists in recognition of an exceptional publication. Felikson received the award for his paper: Felikson, D., Bartholomaus, T., Catania, G., Korsgaard, N., Kjær, K., Morlighem, M., Noël, B., van den Broeke, M., Stearns, L., Shroyer, E., Sutherland D., and Nash, J., 2017. Inland thinning on the Greenland ice sheet controlled by outlet glacier geometry, Nature Geoscience. Felikson shares this year’s award with Doug Brinkerhoff.

2019 JPL Outstanding Postdoctoral Research Award
Társilo Girona
Jet Propulsion Laboratory
Advisor: Vincent Realmuto

Dr. Társilo Girona was awarded the “2019 JPL Outstanding Postdoctoral Research Award” in the field of Earth Science for his research on volcanoes. Dr. Girona and his team found, through a new analysis of satellite-based thermal infrared data, that volcanoes get warm for years prior to eruption. This finding will help to understand subsurface volcanic processes and improve eruption forecasts.

Earth Sciences Division Atmospheres 2019 Performance Award for Outstanding Tech/Field Performance
Ryan Stauffer
Goddard Space Flight Center
Advisor: Anne Thompson

On September 20th, Ryan Stauffer received a Code 610 Atmospheres peer award for his outstanding leadership, coordination, and execution of the May 2019 Satellite Coastal, Oceanic, and Atmospheric Pollution Experiment (SCOAPE) oceanographic cruise in the Gulf of Mexico.

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