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IN MEMORIAM

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In memory of our mentor: Frans de Waal (1948–2024)

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Abstract

The world lost a towering figure when primatologist Frans de Waal passed away on March 14, 2024. Many are aware of his multitude of contributions to the field. His ability to see what animals were actually doing changed how we viewed first primates, then other species. He shared these insights through both traditional scientific outputs, such as journal articles and scientific presentations, and less common outputs, such as 15 books and two TED talks viewed millions of times. What may be less well known is his impact as a mentor. Here, 25 of us who were Frans' graduate students, postdocs, and long-term research assistants share his personal impact on our lives.

KEYWORDS
Frans de Waal, mentoring, obituary

Frans de Waal, who passed away on March 14, 2024, was a remarkable scientist and writer who changed how we view our place in the world. Over the course of his career, he repeatedly demonstrated that primates—and other animals—are thinking, feeling individuals with complex behaviors that had previously believed to be restricted to humans, such as empathy, power, emotion, culture, reciprocity, equity, and morality. De Waal was a gifted observer of behavior, which was not only the backbone of much of his research, but the foundation upon which he built his experimental work. As he routinely told us, the best way to learn about the animals was to watch them, and he encouraged his students to spend time observing our species before we developed our projects. He also had a gift for creative experimental designs to answer the questions that emerged, which allowed us to design empirical studies to ask the questions we drew from these observations. With his support, members of his lab studied a diversity of topics spanning conflict resolution, reconciliation, power dynamics, policing behavior, cooperation, inequity, empathy, social learning and culture, individual recognition, emotional behavior, and trust. Beyond this, he considered the implications of these behaviors for the evolution of human behavior.

He was also an award-winning science writer, with a prolific career spanning four decades and 15 books (a sixteenth will come out posthumously). His first book, *Chimpanzee Politics*, which conveyed the complex Machiavellian scheming of a group of male chimpanzees, was first published in 1982 and is still in press, more than 40 years later. Subsequent books won multiple awards and topped bestseller lists as they showed the general public the impressive abilities of apes, monkeys, and, ultimately, the entire animal kingdom. He was not speciesist, arguing in *Are we smart enough to know how smart animals are?* that other species are, in fact, much smarter than we give them credit for, but we fail to design studies that accurately convey their abilities. He was also not afraid to consider what work in other species meant for humans, for instance in his most recent book on sex and gender, *Different*. Indeed, his books gave him an outlet to highlight the work of a wide variety of scientists, bringing many of them attention in the mainstream that they might not have received otherwise.

Frans de Waal received his Kandidaats in biology from the Catholic University of Nijmegen (now Radboud University) in 1970, followed by a Doctoraal in 1973 from the University of Groningen and a PhD in 1977 from the University of Utrecht, under the direction of Jan van Hooff. After nearly a decade as a research associate at the University of Utrecht, he moved to the Wisconsin National Primate Research Center in 1981 and then on to Emory University in 1991, where he finished his career as the Charles Howard Candler Professor of Primate Behavior and the Director of the Living Links Center. During that time, aside from his books, he published more than 400 peer-reviewed papers, chapters, and reviews. He gave hundreds of talks, including two TED talks that have accrued nearly 10 million combined views. His awards and honors are too numerous to list, but some of the highlights include being inducted into the US National Academy of Sciences, the American Academy of Arts & Sciences, the Royal Netherlands Academy of Arts and Sciences, the Japanese Society for the Promotion of Science, and being named one of Discover magazine's "47 Great Minds in Science" in 2011, along with accolades that are less common in the science community, such as being named one of Time Magazine's 100 Most Influential People in 2007, an Ig Nobel prize in 2012, and six Doctor Honoris Causa.

These achievements have been well documented in numerous places. What may be less well known, however, was the impact he had on us, his trainees. He was thoughtful, considerate, and generous with his time and expertise. He provided us with the flexibility and freedom to explore our own interests and solve our own problems but was always available when we needed his help. He pushed us towards good ideas, gently steered us towards better ones (or away from bad ones!), and always believed in us. He encouraged us to develop our own interests and pursue them and was supportive of

FIGURE 1 Frans' group at the Festschrift held in his honor September 19–20, 2014. Photo by Catherine Marin. Used with permission.

whatever those were. This was clearly true for our professional lives, for which he encouraged us to develop our own research ideas and careers, which for some of us diverged from a traditional academic path. But he encouraged us personally as well, whether it was engaging our partners, attending the important events in our lives, or entertaining us at the Simian Soirees he threw with his wife, Catherine Marin.

In this paper, we share our stories of working with Frans and the impact that he had on us (Figure 1). Each of us has written our own personal reflection on Frans, in our own style and voice, highlighting what we felt were his contributions to our development as a scientist and person. Taken together, they convey the diverse and important ways in which Frans impacted our lives and our careers. We hope that by reading them you learn a little more about Frans.

FILIPPO AURELI

I believe I met Frans for the first time in the office of Jan van Hooff, my PhD supervisor at Utrecht University, who had also been Frans' PhD supervisor. Frans had recently moved from the University of Wisconsin to Emory University and was visiting the country where he was born, grew up, learned about biology, and was trained as an excellent ethologist. After his PhD, Frans had studied chimpanzees at the Arnhem Zoo, about 60 km from Utrecht, whose social dynamics inspired him to write *Chimpanzee Politics*, his first of many best-seller books. This book was one of the reasons I ended up doing my PhD at Utrecht University, although my thesis focused on macaques, like Frans's PhD thesis and his research at the University of Wisconsin. Was it really a coincidence that the topic of my PhD thesis was on conflict resolution that Frans discovered in chimpanzees and studied in detail in rhesus and stumptail macaques?

Based on that encounter and a few more exchanges, Frans invited me to do a postdoc with him at Emory University. It was the beginning of a memorable experience. Soon after I arrived, Frans told me that it was time to leave conflict resolution and move to other research topics. We did so for the main research questions, but he invited me to cosupervise student projects on conflict resolution and …. a decade later we edited Natural Conflict Resolution, which was a challenge (38 contributions by authors from a variety of disciplines and backgrounds) but also a great learning experience (thanks to Frans' knowledge about how to put a book together) and incredibly fulfilling product of my postdoc period (an impactful volume).

My postdoc was supposed to be on capuchin monkeys but ended up being on chimpanzees and macaques. I was lucky to learn chimpanzees' behavior from Frans, a teacher with incredible observation skills, great intuition, and a huge knowledge. His mentoring style provided plenty of trial-and-error self-improvement opportunities and nurtured the growth of my abilities in data collection, data analysis, and critical evaluation. Frans had a special gift for understanding animal behavior, and his study subjects seemed to recognize it and "return the favor." I am sure I am not the only one to recall times in which the study subjects "performed for Frans" like when they engaged in a rare behavior in front of students, colleagues, or visitors as an illustration of what Frans was just talking about.

After the end of my postdoc, I moved to the United Kingdom and then to Mexico, but I did not lose Frans. We had built the foundation for a lifelong relationship. He supported my own students, we invited each other to academic events, and he visited my field sites. On all these occasions, he always brought his mixture of knowledge and humor that along with Catherine's special touch made everybody at ease.

Frans taught me the importance of using images in oral presentations and writing. He could take great photos and make beautiful drawings that he used to superbly illustrate any kind of behavior and was a pioneer in using videos to document his research. I did not learn to do so as well as he did, possibly because I am less skillful, although I like to think that it is because I have studied a challenging species such as spider monkeys. Still, when Frans visited one of my field sites, the spider monkeys performed for him, and he took great photos!

It has not been easy to start writing about Frans de Waal (I preferred to write to him). Now that I started, I feel I could keep writing about the many things that were supposed to be one way and ended up being better, about the "coincidences," the study subjects' performances, and my lifelong friendship with him and Catherine. I have a lot of good memories of Frans. I have a lot of good memories of Frans and Catherine. I will always keep them with me.

KRISTIN BONNIE

I was a graduate student in the de Waal lab from 2001 to 2007, during which I worked with both capuchins and chimpanzees, while also taking my turn caring for the lab fish. To this day, I have no idea why he chose me out of the dozens of hopeful future primatologists that applied to join his lab each year. Unlike many of his followers and admirers, I had never read any of his books until after I was accepted

to the program. To that point, my only experience working with primates had been a summer research internship at Lincoln Park Zoo, where I spent hours each day observing a group of cotton-top tamarins, and as much time as I could in the great ape house and around the staff who cared for them. But, for whatever reasons, the universe brought us together. Frans welcomed me into his lab and instantly became a pivotal influence on the trajectory of my career. And for that, I will forever be grateful.

I joined the de Waal lab in the same year that *The Ape and the Sushi Master* was published, and so my initial research was grounded in the main theory—bonding and identification-based observational learning (BIOL)—first described in the book. In many ways, and to no surprise to those who know his work, *The Ape and the Sushi Master* challenged the dominant thinking about social learning in animals which, at the time, focused on the cognitive mechanisms, such as imitation and emulation, that supported social learning. In contrast, the BIOL model, as I often described, aimed to put the "social" back in social learning, focusing instead on who was learning from whom, rather than how. The social variables that impact learning, cognition, and decision-making in animals became the through-line for my entire research career.

As a mentor, Frans encouraged us—his graduate students—to pursue our individual interests and career goals, while at the same time making it clear that we were to represent the lab, and by extension him, well. On more than one occasion, he kindly but firmly reminded me of his expectations. Never punitive, his approach to mentoring motivated me to be a better, more articulate, and knowledgeable scientist, even on the days that the feedback I received from him, and others in the field, stung. We didn't always agree; more than once we tussled over the wording of sentences in the discussion section of an article—his more daring interpretation up against my conservative one. He encouraged me to take risks while giving me autonomy and authority over my research and writing.

Similarly, Frans supported our individual professional pathways and goals. As much as I love research, I entered graduate school with the intention of pursuing a teaching-focused career at an institution that resembled my own undergraduate experience. Frans inspired and supported this goal by modeling how lectures could be both engaging and informative (and even entertaining) and giving me opportunities to mentor research assistants in the lab. He never once discouraged me from pursuing opportunities to gain teaching experience so long as teaching didn't interfere with my research and progress toward my degree. After observing me teach undergraduates enrolled in his popular class on primate social behavior one day, he sent me an email in which praised my delivery and passion for teaching—it was feedback that boosted my confidence then, and that I've returned to since on the days that a class didn't go as expected. When I was faced with the choice between a research-focused postdoc and the teaching-focused position that would serve as the springboard to my career, he, unlike other graduate school mentors, never questioned or discounted my choices, and instead was unwavering in his support of my career goals, even when they looked different than his own.

In 2022, I returned to Emory University for a leadership role at Oxford College—a role that he certainly had a part in preparing me for. And, once again, I'll be forever grateful for the opportunity that allowed my path and physical location to once again align with Frans and his wife, Catherine. In the year before he became ill, I enjoyed several meals and conversations at his home in a manner similar to the lab gatherings, which he called "simian soirees," that he hosted throughout my graduate school years.

It is an impossible task to fully capture the impact that Frans had on me as a teacher, mentor, scholar, colleague, and human being in just this space. I am, however, certain that I would not be who I am, or where I am today, without Frans de Waal, the sushi master.

SARAH BROSNAN

I joined Frans' lab as a graduate student in 1998. I had never worked with nonhuman primates, but one of my undergraduate projects explored cooperative breeding in prairie voles and I had become fascinated with how individuals made decisions about cooperation. In my reading, I kept coming across papers on cooperation in nonhuman primates by Frans de Waal. I went to the library to read some more of his papers (this was the age of paper journals!) and realized that he was studying exactly what I was interested in. I attended a party at his house during recruitment weekend, most of which we spent discussing possible projects. Two things about that weekend stood out—how kind he and Catherine, his wife, were and how exhilarating it was to talk about science with Frans.

One of Frans' key tenets was that we needed to spend time watching the animals to learn what were the important questions. It was thanks to this—and his willingness to let us ask the questions that interested us—that I started to study inequity. One afternoon I was feeding our capuchin monkey groups peanuts in their outdoor yards, which required distracting the alpha male, Ozzie, so that others could get some. That afternoon, instead of simply grabbing for the peanuts, Ozzie began trading foods, starting with chow, then an orange peel, and ending with a quarter of a naval orange. Not only did he like oranges, but they weren't even convenient; he had to go into their indoor space to get the piece. I began to wonder if the reason he wanted a peanut so badly was that everyone else was getting one. If they were judging their rewards relatively, that might even mean that monkeys had some sense of what was equitable. I brought the idea to Frans, who encouraged me to design a study to test it. It was supposed to be part of my dissertation, but my committee wasn't as enthusiastic, and it got dropped from my proposal. However, once again, Frans encouraged me to run it. I don't know if he realized it at the time—although knowing him, he probably did—but running that study turned out to be perhaps the most important decision of my career. The ensuing paper, published in *Nature*, was the foundation of what is my longest-running research program.

Frans was an incredibly supportive adviser. He encouraged us to pursue the questions we thought were interesting, not the ones he studied, and while he gave us an enormous amount of freedom and

flexibility, he was always there when we needed him, even if we didn't yet realize it. And he always had time for us. We once had a revise and resubmit for an important paper on a tight deadline while I was on the West Coast and he was in France, but he helped from afar (before the days of Zoom) to ensure that it got done. Even years after I graduated, I knew that I could ignore his out-of-office reply requesting that we resend email messages after his return, because he would email me back anyway. He also gave good advice; before my first big talk, in Germany, he noticed that I looked nervous. Instead of telling me not to worry, which wouldn't have helped, he assured me that I should be nervous, because a little bit of nerves is necessary to focus and give a good talk. Indeed, he said, the first talk I gave without being nervous would be the worst talk I ever gave. He taught me to reframe everything from nerves to bad manuscript reviews to see the positive and, more importantly, figure out how to resolve it.

Frans always gave us the credit for our work, too. I was the first author of nearly everything we wrote together; the one exception was a chapter to which I just contributed a few paragraphs, as a second author should. When he talked about our data, he included a photo of us, emphasizing whose work it was. This was true even when he wasn't speaking to scientists; my mother-in-law once attended a lecture by Frans at the National Zoo and suddenly found herself looking at my picture! This extended to publicity, too. When reporters called, Frans insisted that the university send them to me first, on the grounds that if they spoke to him first, they wouldn't call me. This meant that nearly all of the coverage of my work, even when I was a graduate student, included my thoughts.

Frans showed his students that we were important in so many ways, whether it was feeding us dinner, introducing us to a colleague, sending us to meetings, showing us how to write exceptionally well and to give fantastic talks, or just being available to discuss an idea. He attended our weddings, met our children, and invited us to his house for parties, where he played the piano and made sure we all appreciated good French wine. He loved plants and flowers, especially tulips. He and Catherine have a magical garden surrounding their home, from which Catherine gave me the most prolific Lenten roses I have ever seen, the progeny of which I have now also passed forward. He had a terrific sense of humor that infused everything.

Frans' support didn't waver when I left graduate school, and he seamlessly transitioned from being my adviser to my colleague and friend. We continued to collaborate and had students who worked in both of our labs. I even got to continue the capuchin lab; he sent some capuchin monkeys as I started my own faculty position, and when he retired, much of his remaining colony came to live with me at Georgia State (the rest are at the San Diego Zoo). Capuchins are so long-lived that my students are working with some of the same monkeys that I did for my dissertation. I built my career on those monkeys with Frans, and am grateful to now give my students the chance to do so as well.

Losing Frans is hard on so many levels. He was my collaborator and a friend, and for 25 years, the constant in my scientific life. We worked together, shared students and monkeys, and he was always available when I needed advice or wanted to talk about something really cool I'd seen or read. In many large and small ways, Frans is still a part of everything I do. His influence lives on in my lab's research, both in the questions we ask and the monkeys we study. Whenever I see something interesting, I wonder what he would have done to explore it further. Now that I have my own students, I use him as a model for advising, giving my students the flexibility to pursue their own questions, being sure that they get credit for what they have done, passing on his advice, and providing lots of good food and other support. Among the things I am grateful for is that his legacy will live on, through his books and papers, through me and his other students, and through our students, his second generation. The world is a better place for having had Frans in it and I am grateful that I had the opportunity to be a part of it. I could not have asked for a better advisor and friend.

SARAH CALCUTT

I recently reread an email that I sent to Frans as an applicant to Emory's graduate program checking on whether or not the department had sent out decisions. Although it was one of our first correspondences, I realized that his message summed up years of working with him in just a few sentences. Frans was traveling in Japan at the time but responded to my questions within hours. Later, as a student in his lab, I sometimes wasn't sure what country he was in, much less what time zone, but if I needed something and didn't have a reply within minutes, I almost never had to wait longer than a couple of hours. His responses were so immediate it became a joke in the lab that he never slept. In reality, this prompt attention and validation from an advisor who no doubt had countless other responsibilities, made me feel like he had time for me and that my concerns were important.

Frans' messages were quick and concise but also encouraging. In that early email, he reassured me that things were moving along and he was hopeful of a decision soon. This is the same tone that he later used when I went to him with frantic questions about how to deal with the challenges of conducting research. Whether it was bad weather at the Yerkes field station keeping the chimpanzees inside instead of venturing out to play research games or data that didn't make any sense, it seemed like there was always a setback. Frans often had an optimistic perspective to unforeseen situations, suggesting ways to use them to my advantage and gather unique data. His support could shift my approach from perceiving complications as prohibitive to finding opportunities within the mess.

In the email to me, he said “Sorry for all of the waiting. It's part of the game.” When I picture Frans I can see the half-smile that he often had on his face, evidence of his playful curiosity. He approached challenges as interesting puzzles that, with enough effort, we could figure out together. This perspective was contagious, especially given his irreverent sense of humor that helped to bring levity to tense situations and make tedious tasks more fun. Frans taught me many

complex lessons about primate behavior and the scientific process, but the most important lessons were the simplest ones; take the time to make people feel important, don't give up, and find the fun. Also, it's not a lab meeting if there isn't guacamole.

MATTHEW CAMPBELL

Frans was a crucial supporter of my career and development at two separate times, first as an undergraduate and second as a postdoc. I met Frans while lurking outside his office, waiting for him to be free so that I could ask him about doing undergraduate research with him. At this point, Frans had published three books and was giving talks in packed auditoriums. I was intimidated to meet him, of course, so I was nervously fidgeting outside his office while he was meeting with one of his current students. At some point, he popped out into the hall, saw me, and very cordially asked if I was waiting for him. I said yes and told him why, and he paused his meeting to ask me some questions and take down my contact information. Within a few weeks, I was learning to identify the chimpanzees and take observational data while assisting a graduate student on their project. My career traces back to that time meeting Frans, and how open and warm he was with a young student. It was the opposite of what I feared I might encounter (the self-important, internationally known expert with no time for a complete novice). Frans then nurtured my growth, ultimately pushing for me to run my own project as a senior thesis. That is something that would have never occurred to me to do or ask for—to be the lead on my own experiment—and it came entirely from Frans. Without that experience, and without Frans' support during the application cycle, there is no way I would have gotten into graduate school.

After completing my PhD, I rejoined Frans' lab as a postdoctoral fellow. While more independent, I still had a lot to learn from Frans. With the details of how to do science under my belt, I could focus more on seeing the theoretical big picture, which, of course, Frans excelled at. In addition, he supported my desire to get teaching experience alongside the research, which not all mentors share. Without those teaching experiences, I would not have the faculty position I have now at a primarily undergraduate institution. Frans supported me, as he supported all his mentees, in our own specific goals. There was no one right job or career path for his students; he supported them in whatever they wanted to do. These traits, aside from the scientific training, have been most influential for me, my career, and the way I mentor my own students. I would like to think that I am passing on a little of Frans to my students and keeping his legacy alive in future generations of scientists.

DEVYN CARTER

In 2005, I became a research assistant working with Frans and the chimpanzees he studied at the Living Links Center field station just outside Atlanta. I happily remained in that position for five highly rewarding and productive years and maintained a friendship with him and his wife Catherine afterward, as well as several members of our research team. Following my time at Living Links, he would occasionally ask me to contribute to his ongoing studies with drawings, and—most recently—he asked me to read a couple of chapters for his latest book *Different* before its publication and provide some feedback. This was a great honor for me. One of the difficult aspects of losing Frans is that I knew that if I ever reached out to him as a friend or if I were in need of some professional advice or assistance, his responses would be prompt and thoughtful. It is difficult for me to think or speak of him in the past tense. I always felt valued and appreciated by Frans, whether from afar or in person. I will never forget his inclusiveness, exceptional mind, lighthearted sense of humor, and encouragement for our team to be as creative and dynamic as possible within the parameters of our behavioral and cognitive research with chimpanzees. My admiration for this world-renowned scientist and author cannot be overstated. He was an incredible man whose contributions to primatology were immeasurable. With his numerous books, talks, and countless interviews, we will always be able to read his words and hear his voice. I, like many others, will continue to learn from him for many years to come. I adored Frans and consider my time working with him to be one of the most extraordinary periods of my life. He was a brilliant mentor and kindhearted friend who will be deeply missed.

ZANNA CLAY

An intellectual giant, incredible mentor, friend, and colleague—we have lost one of life's true greats. It is difficult to overstate the impact that Frans had on primatology and on all who knew and worked with him. Frans has been an incomparable presence in so many of our lives, including my own.

An exceptional observer of animals, Frans had a deep and brave curiosity for the natural world, one that enabled him to see things beyond the constraints of the status quo. Decades of behaviorism had left other scientists reticent to ascribe human-like traits to other animals, but Frans was different, he trusted his eye and, bolstered by a solid training in Dutch ethology, was unphased in highlighting the continuities he saw. This was a trait I always so admired in Frans, he was never afraid to say what he thought and to take his own path. Through his careful observations and systematic methods, Frans showed us that primates have emotions, care about one another, act prosocially, cooperate, have sophisticated forms of communication, learn socially, and perhaps even behave morally. In his books, Frans brought animal behavior to life on the page, masterfully fusing scientific evidence with insightful anecdotes and stories. I remember, as a teenager, the wave of excitement that struck me when first reading one of Frans' books. I had chosen his book, *The Ape and the Sushi Master*, as my School Science Prize. I remain ever grateful for the "full-circle moment" to have had the chance to work with him for well over a decade.

Frans was never scared of controversy. When he argued that animals had emotions, empathy, or even had sex for fun, he was often accused of anthropomorphism, but what was amazing about Frans was that he just bravely kept going and even turned this on its head, accusing others of anthropodenial, which is the refusal to see the human-like traits in other animals, especially in our closest living relatives. Much of what met resistance then has now come to form the cornerstone of primatology today, and Frans played a huge role in opening many new avenues of study. My own work investigating the evolution of empathy and its expression in great apes would not have been possible without him. He inspired and encouraged us all to think differently about animals and always reminded us of our inner primates.

Frans was an amazing mentor, colleague, and friend. He invested in those who worked with him, encouraged us to pursue our own interests and ideas, and kept things fun. If a work conversation got too heavy, he would crack a joke and shift the topic, I became mindful of his subtle and playful cues! He was a facilitator, who supported us and quietly opened doors. He was amazing at staying in touch, and always made himself available to offer advice at key points of my own professional transition. I always knew I could count on him-

It was never just about the science for Frans, he made everyone feel included and showed great affection and generosity of spirit. In Atlanta, Frans and his wife Catherine would regularly host fabulous parties and lab gatherings at their beautiful Stone Mountain home, we would eat delicious food, beautifully prepared by Catherine, relax, and have fun. Both Frans and Catherine always took a genuine interest in our lives and showed great generosity. I am forever grateful for the warmth they showed.

Another quality I always admired in Frans was his capacity to get a lot done without ever seeming stressed. Conversations with Frans would often be permeated by a constantly pinging inbox chime, yet he would reply to my own emails within minutes. Amongst all his supervisory duties, he remained phenomenally productive as an author and public science communicator. I remember Catherine remarking that Frans' natural state was to be writing. He would write every day, but always without any fanfare. Frans had an air of an easy and carefree approach while at the same time being deeply engaged, organized, and observant, it is a very special quality.

I was so pleased to join Frans on his long-awaited visit to Lola ya Bonobo Sanctuary in the DR Congo in 2018. Since 2011, Frans and I had been conducting research on empathy in the bonobos there, and he was a long admirer of its founder, Claudine André. The two were kindred spirits in many ways, each having done so much to advocate and raise the profile of bonobos. It was a privilege to spend time together with them and the bonobos.

While Frans was sick, I was pregnant with my first child. In respect, love, and honor of Frans, and knowing he didn't have long left, my partner and I gave our son the middle name Frans, who was born 2 months before Frans died. Frans and his wife Catherine were very touched. I told Frans that I would tell my son all about the great person he is named after and the wonderful world of primates. Frans told me that he himself was named after Francis of Assisi, the Saint of Animals. I know his spirit and love for the animal kingdom will live on, now in my own son.

Frans is gone too soon but leaves behind him an enormous and beautiful legacy. I remain ever grateful for his presence in my life. He will be greatly missed and never forgotten.

MARIETTA DANFORTH

It is a struggle to find words that can summarize over 20 years of wonderful memories and experiences that came from the privilege of knowing Frans de Waal. Like other de Waal lab members, Frans was more than just a former professor, boss, and mentor to me. I feel fortunate to say that knowing him forever changed who I am and how I approach life, and most importantly, in how I appreciate life.

So many skills that I use every day can be traced back to my time working with Frans. I can still vividly remember him standing at my desk in the Capuchin Lab in 2003 asking me, “So, what do you know about websites?” while holding the manual for Dreamweaver. And I remember thinking, well, I know it's time to teach myself how to build websites…

Frans didn't just do research, he made it accessible and relatable through websites, books, and lecture tours. While organizing the lecture tour for his *Our Inner Ape* book, Frans approached me one day to say, “The Dalai Lama told me he is giving a keynote for an event on empathy at Rutgers. I think that event would be good for my book tour. Call them and ask if they want me as another speaker.” I remember thinking, “Right, so you want me to cold call Rutgers University and ask them to pay you to crash his Holiness' event?” But like every single place I contacted for his speaking engagements, Rutgers responded with an incredibly grateful and excited “Yes, please.” As a 24-year-old woman, it was such an empowering experience to learn to cold call people and ask for what you want—and get it.

Frans really understood that learning came from experience and doing the work yourself. He knew I was applying to graduate programs and offered to let me be the first author of a study he was paying me as his employee to run for him. He wasn't even obligated to include me as an author but instead, he wanted me to be more marketable and gain experience. And in grad school, when Edinburgh Zoo was behind schedule with their capuchin exhibit, he made room for me back in Atlanta in his Capuchin Lab, like a kid moving back home after college. My entire life trajectory from the moment I stepped into the Capuchin Lab as a 20-year-old undergraduate was transformed. Frans was a constant source of support and encouragement. He was ever the “Sushi master” to us apes. Always “Good Natured.” And while I mourn the end of a time in my life where Frans was just one prompt and succinct email away (with witty and accurate commentary), I take solace in a JK Rowling quote that “Those we love never truly leave us. There are things that death cannot touch.”

TIMOTHY EPPLEY

Coming from a fieldwork background, it was the opportunity of a lifetime to work for Frans as his chimpanzee lab manager from 2010 to 2012. Though I had spent time working with bonobos in the DRC and living in a zoo where I worked mostly with bears, I had never actually worked with chimpanzees before, so I was surprised that he hired me. I vividly remember driving to the Yerkes Field Station in late 2009 to interview for the position and was incredibly nervous and intimidated walking into the lab. However, those nerves were quickly set aside as I entered a room full of laughter and spirited debate over experimental methods, the atmosphere and camaraderie enviable. I soon learned that the others in the room were of every academic level, yet for Frans, it didn't matter what your position was, he actively encouraged everyone to voice their opinions and ideas, especially those that presented a counter-argument. Even in debate, Frans was humble and polite, and if things started to become heated, he could easily break the tension with a well-placed joke. As much as I loved working with chimpanzees, I was determined to return to the field to continue my studies on lemurs. I remember the day I told Frans that I was considering conducting a PhD on lemur behavioral ecology, something very different from the research we had been working on. I was, once again, incredibly nervous as I climbed the stairs up to his office which overlooked the FS1 chimpanzee group, yet he was extremely supportive. He immediately wanted to know more about the species and research questions I intended to study, and over the years, continued to take an interest in what I was up to. Since then, I have attempted to model my interactions with students following his example. The ethos of Frans' lab was to study what animals can do, not what they can't; he trusted everyone in his lab with the same level of confidence that we could achieve our goals.

JESSICA FLACK

This now famous photograph of Frans' shows a male chimpanzee inviting another to reconcile after a fight, with the invitation accepted a few minutes later (Figure 2). It is one of my all-time favorite photographs.

Frans was a gifted scholar of animal behavior and writer, as well as a great photographer. Building on his observations of conflict management—and particularly reconciliation—at Arnhem and later, Yerkes—Frans vastly expanded his understanding of the biological and cultural bases of social institutions. A book written in this period, *Chimpanzee Politics*, conveyed beautifully his deep and really unsurpassed intuition for social dynamics of primate societies.

Whereas the collective behavior community seeks to account for the emergence from microscale behavior of spatial and temporal patterns like flocking in starlings and firefly synchronization, Frans spent the first half of his career chipping away at understanding how individuals collectively create their moral systems and power structures. These macroscopic phenomena are particularly challenging to explain because although the underlying behavior is also

FIGURE 2 Two chimpanzees reconcile after a fight. Photo by Frans de Waal, used with permission from Catherine Marin.

localized in space and time, like flocking and flashing, the information processing of behavior into social rules is more elaborate than, for example, the copying of neighbor trajectories using physical orientation or other proxies, as occurs in flocking. Frans presciently recognized that to understand the emergence of a social variable like power it wasn't enough to quantify individual behavior—social interactions also needed a means of formal description. Working in collaboration with mathematical sociologists in the eighties, he laid part of the empirical groundwork for the network theory renaissance that would begin in earnest under Mark Newman a decade later in the nineties.

The first paper we cowrote and one my earliest—a synthetic piece that started in the late 90s—was on Darwinian building blocks of morality. Like Frans' social network projects, it also focused on the mesoscale, but rather than focusing on the interactions themselves, we sought to distill the modulating social rules. “Darwinian” for us meant logical given constraints imposed on strategy by environments that favored some degree of cooperation and cohesion. It was a long paper with comments by other authors and a lengthy response by us. I regard it to be a decent paper that has stood the test of time. Nonetheless while writing it I came to believe that the literature—to include physics and blossoming network theory—did not have adequate quantitative conceptual frameworks to account for the emergence of complex macroscopic social phenomena like institutions from individual behavior at the microscale. There was at that time neither adequate language nor formalisms for quantitatively describing informational entities like moral codes or power structures. The idea, for example, of power as a coarse-grained macroscale property like temperature but that is collectively computed by interacting individuals, was more or less wholly absent. This recognition in part set the course of my career with its focus on developing an empirically principled theory of collective computation for macroscale emergence in information processing systems.

Perhaps due to a similar frustration, Frans in late 1990s and early 00s continued writing books on morality, power, and culture but

turned his "science mind" to documenting the cognitive origins of complexity at the microscale through the design of clever experiments intended to reveal how smart animals really are—to riff on the title of a lovely, compelling book on animal intelligence he wrote towards the end of his career. Among many achievements, Frans with his students and collaborators showed experimentally that primates do indeed have a sense of fairness.

One of the most important concepts I learned from Frans was gestalt perception, or the ability to perceive wholes and boundaries. A part of gestalt psychology introduced by Wolfgang Kohler and others early in the 20th century, gestalt perception is critical to good observational data collection—it, for example, prepares the observer to "see" the start of a fight before the first punch is thrown. This pragmatic value of gestalt perception belies as Frans also stressed its profound implications as one of life's organizing principles—as a creator of ordered states.

The idea of gestalt perception has been in my mind nearly every day since Frans brought it to my attention. It appears and reappears in my work, from the information theory of individuality to collective computation of social circuits to coarse-graining in nature. It allowed me to reformulate John Wheeler's idea of observer particpancy as a form of coarse-graining out of which emerges higher order interactions and hence matter from information—it from bit—rather than the other way around. These ideas might seem far from those of Frans' and the daily discussions we had in his group, but my point in raising them is precisely to show the rich reach of his intellectual influence.

Despite our different emphases and approaches to science, I am grateful to have known Frans and for our work together. So long, Frans!

KATIE HALL

When I first became a visiting PhD student in Frans' lab (2009–2010), my contemporary peers were in awe of his larger-than-life reputation in the scientific community; one peer commented that as a PhD student he'd recently garnered up the nerve to approach Frans at a conference, complimenting him on his recent *Nature* paper, to which Frans allegedly quipped, "which one? I had two in the last issue." I had the privilege of getting to know Frans instead as a down-to-earth person whose attempts at clarifying conversation points were often made with good intent but sometimes lost in translation or misconstrued in similarly comical fashion. The best example of which was when he identified a common backyard bird from the United Kingdom, stitched on a female student's sweater, simply by pointing and declaring the name. The poor man was immediately deeply embarrassed when he realized the double entendre! Despite this awkward moment, Frans always made the lab environment very open and jovial, and members of the lab always looked forward to his visits to the field station as an opportunity to share progress, and work through ideas and challenges. Additionally, he and Catherine often welcomed us into their home and hosted many fabulous dinner parties where conversations inevitably returned to the chimpanzees and their antics. The time I spent in Frans' lab was the start to many great intellectual relationships and friendships, with humans and chimpanzees alike. Throughout the years, we enjoyed celebrating each other's achievements and milestones, and at his Festschrift we nodded to Frans' affinity for bowties by wearing enormous, whimsical, novelty bowties in his honor.

SARAH HUNEYCUTT

I have learned many things from Frans over the years. He showed me both professionally and personally what it means to be successful. He showed his students what it meant to be an excellent mentor. He demonstrated this each and every time he was credited with success and was quick to use the opportunity to promote his students and credit their contributions. In fact, I can't help but think that he would be smiling right now knowing that, even in his death, he was offering his students an opportunity to publish. He pushed us to work hard and leave our mark. Frans and I connected on our passion to investigate similarities in our primate relatives as well as over our frustration with the mundane question of what makes us uniquely human. I remember the twinkle in his eye when I revealed to him that the chimps had outperformed the human children in a video hide-and-seek task I had conducted as part of my master's thesis. He found it much more interesting to explore the ways in which we primates were similar as opposed to the quest of so many researchers at the time to find what made humans unique. He appreciated that this common ground leads to connection which opens the door for conservation. Frans had a way of making meaningful connections with both human and nonhuman primates that made me profoundly respect him.

But it wasn't with only primates that Frans connected, but rather nature in general. His home was warm and welcoming, and there was always an element of nature whether it be the expansive windows that looked out into a serene, wooded backyard filled with birds, his impressive fish tank in his home office, or his office at the field station that looked out onto the chimps. He always surrounded himself with nature. As I have grown older, I have taken this lesson to heart as well. I find sanctuary in nature and around animals, and it always calms me from the noise that buzzes around when life gets hectic. I try to remind myself to never lose focus of my awe of the beauty and complexity of the natural world; something I think Frans modeled well as a mentor.

Of all the things he taught us though, I think the biggest impact Frans had on me was the way he nurtured and protected those he cared about. He treated his students like family, and I was deeply appreciative of how he opened his home to all of us. It was this warmth and kindness that I felt most privileged to have experienced with Frans. It was through these personal glimpses of the man he was that I believe he taught me the most. He was calm and gentle, never hurried or stressed. He took time to enjoy and appreciate the animals, pointing out little behaviors he noticed even as he walked past on his

way to a meeting or lecture. He was kind and caring and took the time to nurture his relationships with his students in a way that made me feel seen and respected.

It is hard to think of the world without Frans in it. I will take comfort in the fact that I can still hear his voice in my head each time I pick up one of his books. The world has lost a truly amazing primate, but I feel honored to carry some of the wisdom he passed on and will try to impart the same appreciation for nature and our nonhuman relatives that he spent his whole life modeling so beautifully.

PETER JUDGE

I gave an oral presentation on reconciliation in captive pigtail macaques at the American Society of Primatologists meeting in East Lansing Michigan in 1983. During questions afterward, one belligerent fellow said that my work was rubbish because reconciliation was an artifact of captivity and did not occur in the wild. I was a bit at a loss for words, but then an unfamiliar audience member stood up and came to my rescue by calmly saying that that was untrue. Reconciliation was being documented in the wild. He turned out to be Frans.

Frans devised a rather simple yet eloquent methodology for testing for the occurrence of reconciliation by comparing affiliation between former aggressors during a postconflict interval to affiliation between the same two parties during a matched-control interval to determine if affiliation between former opponents occurred sooner during a postconflict interval than a matched-control interval. The technique came to be known as the "PC-MC method." I was analyzing my dissertation data on pigtail macaque reconciliation at the time and was unaware of his technique. I devised an ungainly and complicated methodology for testing for reconciliation that came to be called the "rate method." I averaged rates of affiliation between former opponents across all postconflict intervals and compared them to average affiliation rates across all baseline intervals. Frans was skeptical. At the American Society of Primatologists meeting in New Orleans Louisiana in 1988, Frans grilled me for over an hour until I convinced him of the soundness of my technique. Unbeknownst to me, this was also an interview for a postdoctoral position that Frans was expecting to fill.

Frans always emphasized that nonhuman primates have developed mechanisms to overcome the inevitable conflicts due to living in social groups. The postdoctoral project was designed to test whether rhesus monkeys living at various population densities would display coping mechanisms rather than increases in aggression that were predicted by traditional theories of crowding. Frans chose me for the position (thank you, Catherine) and it opened up a whole new world of lifetime opportunities for me. Thanks to Frans' grant, I observed rhesus monkeys at the Wisconsin Primate Center, Yerkes Primate Center, and Morgan Island off the coast of South Carolina. Frans lets you work very independently, but with high expectations. Working with Frans brought me into contact with many prominent primatologists at the time and perhaps, as importantly, talented postdocs, doctoral students, and research associates whom he selected to work with him and with whom I have maintained friendships over the years.

When the postdoc was over, I asked Frans that if I ever got a real job, would he send me some of his capuchins. Frans said "yes," but I have always wondered whether he was thinking I probably would never get a real job. Anyway, I obtained a tenure-track position and Frans made good on his word. He sent me six brown capuchins that became a cornerstone of my work. The Capuchin colony will be my legacy, but, in actuality, it is Frans' legacy. His influence extends everywhere. I teach a Primate Behavior and Ecology seminar course and his name and his work come up in almost every class.

I owe my career as a primatologist to Frans. When I first moved to Madison Wisconsin to start my postdoc, Frans and Catherine let me stay in their home until I got settled in. That was Frans: Generous, thoughtful, always encouraging, and, above all, very funny. The world will miss him.

DARREN LONG

Frans de Waal hired me in 1996 to help manage his colony of 40 capuchin monkeys at the Yerkes Primate Center. I was wholly underqualified for the job, but for reasons I still don't understand, Frans decided to give me a chance. The part-time National Institutes of Health-funded job paid $8 an hour and I was thrilled to have it; for the monkeys, of course, but primarily because it put me in the close orbit of the man whose books and observations on behavior had so fascinated me that they changed the direction of my career. I spent 5 years in the lab, most of them helping to administer Living Links, Frans' new center for the study of human and ape evolution at Emory University. I had the great privilege of interacting with Frans a few days every week over that period and came to know him well.

Many tributes to Frans have focused on his astounding scientific mind, his ability to translate complex concepts into captivating stories, and his outsized impact on the field of behavioral psychology. All of these are well-known, but there was much more to Frans than what we read in his books or heard in his compelling lectures. I'll share a few of those anecdotes here.

Frans was incredibly funny and loved to laugh. Watch any of his lectures and you'll see they were peppered with witty asides designed to entertain and connect him with his audience. He played piano for guests at his parties, and after a beer or two he'd often organize students and colleagues for lively academic discussions. Frans enjoyed keeping and watching fish, which seemed to bring some peace to his ever-active mind. He was intrigued by the antics of his three house cats; creatures so very different from the primates he studied. Frans spoke at least five languages (that I'm aware of), including Japanese. He loved cooking and good food, passions he shared with his equally fascinating wife Catherine.

Frans was an avid photographer with a keen eye for context. He was an early adopter and innovator; a computer programmer who was constantly seeking ways to use digital technology to support and

enhance his research. Frans was a big man, intellectually intimidating, and with a Dutch personality that eschewed small talk for meaningful conversation, some were led some to believe that he was hard to reach. The opposite could not have been more true. Frans de Waal was a gentle giant of both academia and humankind, a kind soul who nurtured many students and careers, and a forgiving friend. His absence leaves a chasm in the hearts of so many, including my own.

AMY PARISH

"What you do makes a difference and you have to decide what kind of difference you want to make." —Jane Goodall

Frans de Waal made a difference. He made a difference to his students. To his colleagues. To his family. To his university. To the nonhuman animals he studied. To our body of scientific knowledge. And, perhaps most profoundly, to the public understanding of nonhuman animal minds and behavior.

Frans defied categories. Steeped in the European traditions of ethology originating with Konrad Lorenz and Niko Tinbergen and passed down to him through Jan van Hooff, Frans might have struggled to find a fit with the more anthropological and socio-biological focus of American primatology. Instead, he came to America and joined the faculty in psychology departments at Madison and at Emory and he broadened our perspectives. Rather than focusing on competition, the selfish gene, and survival of the fittest, Frans was inclined to focus on cooperation. This, too,d created a bridge in its parallels to work being done by many primatologists in Japan. When he visited me in Thailand, I took him to a zoo where dogs and tigers raised by the same dog mother continued to live in one cage as adults. We posed in front of a giant sculpture depicting an eagle and tiger in a fierce battle at the zoo entrance. I quoted Tennyson's "Nature Red in Tooth and Claw." Frans went home and wrote a piece titled "Survival of the Kindest" for the Chronicle of Higher Education.

Frans was my "Doktorvater." The cochair of my PhD committee. The perfect complement in his applied focus to my Doktormutter Sarah Hrdy's focus on the theoretical. He didn't say "I told you so" when, despite his warnings, I collected too much data on a tape recorder and had to spend an entire 2000+ mile drive from San Diego to Madison transcribing it. He didn't hesitate to share his data when I started noticing a pattern of female bonobos attacking males and inflicting blood-drawing injuries. He didn't complain about writing numerous letters of recommendation for grants and jobs and he didn't hesitate to lodge a protest at a university that treated me unfairly. He did embrace my findings that bonobos are a female-dominant matriarchal society. He did embrace the value of an anecdote. He did offer a nuanced perspective on the question of anthropomorphism. He did invite me into his home in Madison and later in Atlanta and then Utrecht. He did visit me in Davis, San Diego, and Thailand. He did include me in family moments where I was so often struck by the deep and abiding happiness of his marriage to Catherine Marin. The way that they laughed together to this day ranks them as the happiest married couple I have known. Each part of Frans was wonderful, and the whole was even greater than the sum of the parts.

From our first meeting when I was an undergrad at the University of Michigan in about 1987 to our interviews on Nightline in 1992 to our dialog on the stage of the LA Library in 2013 to our appearance in the film *Second Nature* which screened at the Los Angeles Museum of Natural History in 2024, Frans was a collaborator. An egalitarian. A deep thinker. He was also a Renaissance man equally at ease playing the piano, discussing Salvador Dali, redefining the origins of a sense of fairness, or influencing members of Congress through his writing. He helped us to understand the hierarchical world of the chimpanzee while at the same time, he ignored the hierarchies of academia and treated everyone as a peer. He was my mentor. My friend. My colleague. An inspiration. His legacy lives on in the people he inspired, the relationships he fostered, the students he trained, and the discoveries that astounded, delighted, provoked, and impressed us. What Frans did made a difference.

JOSHUA PLOTNIK

Frans de Waal was a giant among primates, and as a former student of his turned colleague and friend, it's nearly impossible to put into words the impact he had on me both professionally and personally. I joined Frans' lab first as a summer undergraduate researcher more than 20 years ago, and, 2 years later, in 2004, I became a PhD student at Emory under his mentorship. I tell my own students today that the opportunities he provided to me and the risks he let me assume would not have been possible under the mentorship of most other scientists. He let his students innovate and learn from their mistakes while championing them in front of a larger academic audience. When I told him early on in my graduate student career that I wanted to ask questions about cognitive convergence in nonprimates, he expressed excitement and told me we'd find a way. Six months later, he presented me with an opportunity to study mirror self-recognition in elephants. A year later, when I asked Frans if I could explore studying Asian elephant cognition in Thailand, he didn't hesitate to take from his discretionary funds and support my travel abroad. I have now spent the better part of two decades studying elephants, 17 of them in Thailand. Frans encouraged me every step of the way. He was not an overly "hands-on" mentor; he did not need or desire to know where his students were every day or how many hours each day they spent on research. He explained to me that becoming an independent scientist was a process that required students to take chances on their own ideas, not his. He often asked me what I planned to do to deal with an experimental hiccup, rather than tell me how he thought I should handle it. While that caused anxiety in my early days as a student, I relished it as my passion for and experience with research grew.

We spoke regularly while I was in Thailand, and when he and his wife Catherine visited me several months into my nearly 2-year field trip in the middle of my PhD program, Frans told me how proud he

was of what I had accomplished. We spent many hours on a bamboo platform overlooking a group of elephants talking about data and developing new ideas for research. He taught me how to carefully consider the need for controls when designing experiments and to consider the ecological validity of a comparative approach when studying understudied animals like elephants.

Frans was an exceptionally skilled media personality who knew exactly how to craft manuscript titles and abstracts for both a scientific audience and a public-facing one. I learned so much about how to translate my science for the public from him, even when several faculty colleagues discouraged us students from doing so. Frans never seemed stressed; he relished scientific debate, and told me often that, while we should consider and accept criticism of our work, positive or negative attention towards it meant that we were doing something right—we were getting the community's attention.

I grew significantly closer to Frans after I received my PhD and moved away from Atlanta. He helped me as I navigated the difficult post-PhD decision-making process, moving from a postdoctoral position to faculty positions across three continents. I'm not sure I would have made the same decisions without his guidance and friendship. We corresponded regularly by email about collaborative projects or media opportunities, and whenever I desired career advice, I sought Frans out first. I remember every single time he visited New York City for a lecture or book tour over the past 15 years because he made a point of making sure my wife also felt welcome at dinners or visits to the Metropolitan Opera. I prepared in advance for every visit with Frans because I felt like I was meeting with a sage giving profound advice every time (even if, in the end, we only ended up telling jokes or talking about politics).

As a comparative psychologist, I am grateful for his immeasurable contributions to the fields of primatology, animal behavior, and cognition (many of which have been recounted in the pages of this journal). But, as Frans' former student and his friend, I am even more grateful for the impact he had on me as a scientist and as a human being. I will really miss him.

JEN POKORNY

I was a graduate student with Frans for 6 years, from 2003 to 2009. While academia often prioritizes current research and contemporary perspectives, he taught me to appreciate the broader context of ideas—why certain theories may have arisen when or where they did, and how perspectives have evolved over time. His research interests were fundamentally interdisciplinary. We were exposed to a variety of fields, ethology, anthropology, primatology, psychology, behavioral economics, and more. This was hugely influential to me in broadening my understanding of topics and it underscored the interconnectedness of knowledge across disciplines.

This has been beneficial throughout my career as I explored other areas of research that may not on the surface appear to be related, but I clearly see the common threads that connect them and can draw upon and am inspired by disparate areas of research. Frans' intellectual curiosity knew no bounds, which in a way gave us freedom to explore widely and not be constrained by arbitrary disciplinary boundaries.

It is not surprising then that Frans was always supportive of allowing us to pursue our own individual interests, even if they diverged from his primary areas of focus. He fostered an environment of critical thinking and curiosity. Everyone in the lab would regularly discuss the projects we were working on, and each took turns picking articles to read for our journal clubs. He challenged us to go beyond our areas of specialization and engage with ideas in other domains. He encouraged open discussion and everyone, regardless of their specific research specialization or how new they were to the lab or to research in general, was welcome to contribute their ideas, suggestions, and critiques.

He supported our careers and interests in other ways as well. For my graduate research, I was interested in questions of face recognition and social categorization and wanted to explore these topics using a touchscreen computer system with capuchin monkeys. While others in the field had used similar technology for quite some time, it was new to me. Instead of having me reach out to people individually, we decided on holding a symposium focused on the practical aspects of computerized testing with primates. Frans let me and another graduate student take the reins to organize and host the symposium, which was quite an opportunity for a new graduate student. The event was successful and fostered a tremendous amount of useful information exchange among the attendees. Besides the specific technical advice I received, it also provided me with an immediate network of fellow researchers early on in my career.

One of my favorite memories was spending hours going through Frans' filing cabinet of academic papers in his office during my first few months of grad school. While we did have digital papers, there was something quite unique and invaluable about going through his personally curated repository. I found many papers there that I would have never come across otherwise, and since I hadn't yet spent much time with Frans, it gave me a glimpse into what he deemed relevant but also what intrigued and inspired him.

There are many other ways in which he has remained profoundly influential to me all these years later in how I view and approach research. Especially as I moved into different fields and particularly in conducting research with humans. However, the academic and intellectual aside, he should also be remembered for all the times he invited us to his home, where he and his wife Catherine hosted amazing dinners, and we spent hours laughing and talking about numerous random topics. He modeled the importance of taking time away from work and socializing with one another. For as productive as Frans was, he balanced and prioritized other things in life that were important to him, which is a good lesson and reminder for all of us.

STEPHANIE PRESTON

I was thrilled to secure a postbaccalaureate research assistant position with Frans de Waal after college. I had rotated through labs—from neuroanatomy to motor control to the sodium potassium

pump to the monogamous—but hadn't found my "calling" (perhaps more trait than state…). After a lab picnic in washing, Dr. Insel mentioned that I could study monkeys at Emory. I practically packed my bags that night and drove straight to Atlanta to join him. After a few months with Zuoxin Wang and the beautiful voles, there was an opening with Frans and Filippo Aureli to measure heart rate in rhesus macaques. I was to sit in the tower atop the rhesus social group at the Yerkes field station, antenna, and notebook in hand, binoculars on my neck, to study the individuals, their codes, relationships, and behavior. I was hooked.

Part of the reason I loved that job is because of Frans, and the special team he assembled and nurtured. Frans had organizational leadership skills before it was cool. Perhaps due to his deep understanding of cooperation, he invested a lot of time in the team. Frans took us out for monthly pizza dinners and invited us to long evenings on his screened porch, full of jokes, cultural observations, science, and Heineken. We even played soccer as a team sometimes. Everyone shared a passion for the research, with a deep concern and regard for animals. Frans had a calming social ease, paired with enough seriousness and distance to ensure we listened and worked hard. I vividly remember the few times I stood by the chimpanzee colony with him, struck by his familiarity and ease with each individual—and vice versa. He was so engaged in observing, testing, and talking about their capacities, even with a newbie assistant. I was mortified to report earning a C on his first Primatology exam, because I hadn't known we were to learn the names of the scientists. Frans imparted a life-long lesson in how science is not just an abstract aggregation of facts, but an enterprise of people (with its attendant *Chimpanzee Politics*)—again demonstrating his intuitive understanding of social groups. I learned so much in a year and a half, steeped in the ideas and observations, like an immersion student returning from life with a kind family in a distant culture.

In graduate school at Berkeley, I studied food-storing animals. During a proseminar, my advisor Lucy Jacobs tasked us to describe a behavior through Tinbergen's four levels of analysis. Being influenced by Frans's book, *Good Natured*, and recently learning about mirror neurons from Rich Ivry, I wrote about empathy. The original draft was a simple class paper, but my mentors suggested publication. I asked Frans to collaborate, since I had learned most of the ultimate mechanism and nonhuman behavior from him. I would send drafts and he would say simple things like, how about adding a section on autism/psychopathy/figures/photographs, etc.? Each time I would disappear for weeks into a rabbit hole of research, rightly trusting his expertise and motivated by his quiet, clear instruction. Even as a nonnative speaker, Frans edited my prose to be simpler, clearer, and more engaging. A renaissance man, he imparted the value and joy of adding things like art and photography to science, which enriched all of his work. We worked on multiple other papers over the following decades, to similarly good results. He was simply a great communicator, in any language or format.

Frans had an unmistakable and unwavering focus on teaching the world how kind, sophisticated, and similar to us nonhuman animals really are. He made a lasting impact on my life, my career, science, and the world as a whole. We are, all of us, forever changed.

DARBY PROCTOR

When I was beginning my career, Frans hired me as a research technician in his lab at Emory's field station (where I later returned as a postdoc). Getting a chance to work with chimpanzees was a lifelong dream and working with Frans became one of the most formative experiences of my life. Trying to synthesize everything I learned from him would be impossible, so I will focus on two things that profoundly impacted me.

First, Frans had an insatiable curiosity about primates, and indeed all animals, that he tried to pass on to those of us in his lab. He once sent Vicky Horner, who was his postdoc at the time, an email that had a picture of a snake attached. Unfortunately, he wrote the email in Dutch which none of us could translate. He later told us it was a snake in his yard that he thought was interesting. While the focus of his work was on primates, he was always observing and questioning what he saw in animals and inspired us to do the same.

Second, Frans fostered an incredible culture in his lab. When discussing science, he challenged us and encouraged us to challenge him. This created a culture of intellectual rigor but also a sense of community, as those debates were often held during a meal, whether it was bagels at a lab meeting or at his house where his wife, Catherine Marin, would cook elaborate meals. While those of us who worked in his lab are now scattered across the globe, we remain a community that can call on each other whenever needed.

Thank you for everything, Frans.

TERESA ROMERO

Before I joined Frans' lab, I was fortunate to work with Filippo Aureli, who had previously worked with him. It was Filippo who told me of an opening in Frans' lab and encouraged me to apply (thanks so much Filippo!). Like many other students with an interest in primatology, I had been reading his work, and I knew this was an opportunity I could not let pass, so I did not. The first time I met Frans was in Amsterdam. He was visiting Europe and wanted to meet to discuss the project linked to the post-doc position. Back then, I was a bit nervous; in a way, it was an informal job interview. However, Frans was warm and welcoming, the conversation quickly shifted to possibilities beyond the initial project. And just like that, I had the pleasure of enjoying the first of many wonderful and stimulating discussions with Frans over a good meal.

The 2 years I spent at his lab were extremely impactful and shaped my career, as well as my approach to research. The project I was working on involved analyzing a long-term database on chimpanzee behavior, and believe me, there was plenty of information to work on. However, I could not resist the opportunity of being

at the Yerkes Primate Research Center and not working with the chimpanzees and capuchin monkeys. Even though I had little experience designing and running experiments, Frans trusted me and allowed me not only to try but to fail, and then to try again. Frans was extremely knowledgeable and a keen observer of animal behavior. I learned from him to pay attention to details, but most importantly, I learned the importance of designing studies that are relevant to the study species. An experiment that is appropriate for one species may not be suitable for another, and obtaining no evidence when the design of the study has not considered the species' biology and ecology, is not "evidence of absence." This was a fundamental lesson that has stayed with me throughout my career.

Frans fostered a lab environment where brainstorming and ideas generation felt like routine, and where we could openly and respectfully challenge and debate one another. The time I spent at his lab played a major role in shaping not only my way of studying animal behavior and cognition, combining observations and controlled experiments, but it also had a profound impact on my approach to supervision and mentorship. Frans was kind and supportive and had an amazing sense of humor. It was always a treat to be invited to one of Frans and Catherine's diners, which I was fortunate to continue enjoying well after I left his lab every time I visited Atlanta. I remember Frans with warmth and I feel extremely lucky to have known him.

MICHAEL SERES

Now living in Japan, I was devastated to learn that Frans passed away on March 14, 2024. I miss him dearly!

I first met Frans de Waal in 1980 on my first tour in Western Europe to visit 15 zoos in Austria, then West Germany, The Netherlands, and Belgium. Along with my wife and two friends, I drove a two-stroke engine Trabant on this 4000 km journey. Working at the Budapest Zoo as a Head Keeper of Primates, my main interest was to see and photograph zoo exhibits keeping chimpanzees in social groups. Among these zoos, my priority was the Burgers Zoo in Arnhem, The Netherlands where they kept the then largest group of chimpanzees in the world.

I did not know Frans in person back then; however, I had the pleasure of meeting him briefly on my 3-day visit whilst he was conducting observations in front of the large exhibit. I introduced myself with my broken English, awkwardly tried to explain how much I was interested learning about chimpanzees' social behavior. I particularly expressed that my main interest (back then) was to learn how juvenile chimpanzees learn to be mothers, how do they get experience to be a "good mother." Frans pointed out to me several of the juveniles carefully handling infants in close proximity to their mother, "supervising" the repeated actions. Later my observations got published in a Hungarian Magazine, a photo essay illustrating the process.

I never imagined that years later I was going to be working with Frans at the Field Station of Yerkes National Primate Center in Lawrenceville, GA!

Years passed by. I left Hungary in 1983 and I started working at the Field Station of Yerkes Ctr. in 1987. [Yerkes Center was my "dream land" back in Hungary, where all four species of great apes are kept. I already possessed many of the Yerkes-based scientists' publications, in a format of reprints as well as the six volumes book *The Chimpanzee* edited by G. H. Bourne which cost me 6 months of my Hungarian salary; I imagined Yerkes Center as a heaven for primates, especially great apes.] I was hired as a Primate Care Specialist of great apes based on my 10 years' experience at the Budapest Zoo and reference letters supporting my interest sent to the Yerkes director by Dr. Jane Goodall, Dr. Geza Teleki, and Prof. Gyula Gyenis, a Hungarian anthropologist.

I started working there with great enthusiasm that even jumped exponentially when I learned that Professor Frans de Waal was about to come to Atlanta to Emory University and to the Yerkes Regional Primate Research Center from Wisconsin, to continue his work, especially with chimpanzees at the Field Station. I immediately sent him a handwritten letter reminding him that we had already met at the Burgers Zoo in Holland while expressing my life-long dream to work with chimpanzees and of course with him. He "bit the bait" and was a fool, offering me a job, one TO ME with no academic background, no university degree, all to my tear-jerking delight! [I already started my college education at the Gainesville College in Gainesville, GA—but left in an exchange to work with Frans, which lasted for 9 years.]

I knew Frans was not just "any" scientist studying captive chimpanzees' (and bonobos') social behavior. He was a meticulous observer capable of spending hours recording chimpanzees' behavior in detail, with a fantastic insight that opened my eyes to a great deal. I knew I had to live up to his standard to be a keen observer, have patience, consistency, and accuracy in collecting data. I wanted to prove to him and to myself as well that I am capable of doing all these. The daily 90-min global observation and the weekly three times 30-min food tests became my routine, with all data transcribed by the next morning and entered into the computer by Frans' liking. So, I worked diligently, day after day, year after year—I think much more than Frans originally expected. He silently acknowledged my workload and trusted me collecting data, introducing, and teaching many new students and postdocs who were learning to observe and collect data for their own work on what was by then three groups of chimpanzees. He only came to the Field Station twice a week when we all had fruitful conservation, heated discussion, and arguments in like a big family setting. Frans, though, always loved to hear my or other's opinions and insights, often rejected suggestions on how to proceed and entered into new directions so that some of us remarked "he is a stubborn Dutch, does not accept changes; doesn't like the GA heat and humid weather but loves coffee and his favorite slogan is 'Good luck with it'," especially to new ideas of students. He spent a lot of his time writing in his "FS-1" group's tower office overlooking the chimpanzee compound that also allowed him to take many of his great pictures and film actions whenever they occurred. He was a great photographer with sharp eyes on how and when to capture meaningful images of actions. He also loved to have close contact

with the chimpanzees—played with them, groomed them whenever he had time, greeted them upon his arrival—and the chimps vivaciously returned all Frans' initiatives. He became one of them and the chimpanzees accepted and indicated by their behavior that Frans was an "outside group member."

We, both, all those chimpanzees he worked with and myself, lost a friend, a leader a teacher, and a great media person and will continue to miss him until we inevitably follow him to "Chimpanzee Heaven" to meet again, continue working and living together, forever!

MALINI SUCHAK

I had the privilege of having Frans de Waal as my graduate advisor and working with him from 2007 to 2013. By the time I started graduate school, Frans was already a prolific author and public figure. Even though he had many competing demands, his students were always a priority. He was always happy to leverage his network to ensure we were making connections in the field, and he championed our opportunities to attend workshops and conferences.

Like so many of his students, he had me start by simply spending time observing the capuchins (and later the chimpanzees) that I would be working with. This process, and what I learned by taking this time, has become invaluable in my work today. I am cautious by nature, but he encouraged me to think big with research and take risks. He trained me to explain my work in language that was exciting and accessible, and instilled in me a distaste for two-part titles with excessive jargon, something that I appear to be passing along to my own students. I am grateful for our work together on cooperation and prosocial behavior and for having Frans as a role model who genuinely treated people well and approached difficult situations with humor and grace. It shaped me into who I am today. Thank you, Frans, for everything.

PETER VERBEEK

As I understand it, the idea for this collective obituary for Frans de Waal is to focus on the personal aspects of our relationship with Frans. If "personal" means our deepest feelings about him and our relationship with him, then I find that difficult to share through a public forum such as *American Journal of Primatology*. All I can say to that is that with Frans' death, I lost my respected mentor and beloved friend, and I feel that with his passing part of me is gone. I expect that I will never get used to not having him in my life anymore.

Personal also means, I think, the ways in which Frans affected the course of my life, my work, and my thinking, and here I would like to focus on those aspects of "personal." Frans and I are close in age, I am only a few years younger, and we share similar memories from growing up in the Netherlands. I was a budding naturalist and a member of a youth organization of nature study, and so was Frans. I hiked the Dutch polders observing birds and other creatures that make these lands claimed from the sea their temporary or permanent home. And at home, I spent hours in front of my aviaries and aquaria, and, eventually, with my dogs. Frans' experiences were very similar; no dogs, I believe, but plenty of other animal companions, from jackdaws to fish and more. From observing nature during my early youth, I gained an impression of nature being exquisitely well-organized and generally peaceful. That was a thought that I carried with me during my early adult years as a businessman, and when I went back to school later in life I followed up on these early impressions and, thanks to Frans, they would come to define my life.

The Christmas when I was a junior in college my late father gave me the Dutch translation of Frans' "Peacemaking Among Primates" ("Verzoening"), and that same Christmas I received the original English version from another person close to me. At the time, I had a research project on conflict resolution among children at a local preschool, and I volunteered doing observations of captive chimpanzees for the "Chimpanzoo" project of the Jane Goodall Institute. I had also started an observational study of social behavior in a captive group of mandrills. Frans' book was an eye-opener for me. Here was a scientist who introduced peace as a biological phenomenon and convincingly backed it up with beautifully described research findings. I had found my calling. I needed to work with this man and learn from him! And I was so fortunate to be able to do both, becoming Frans' first doctoral student at Emory University.

Frans was a myth buster. Through his meticulously designed and executed research, he took on age-old philosophies shaping popular convictions that war is in our genes and that peace is a human invention. And that culture, fairness, and morality are uniquely human. In essence, he effectively challenged the grand myth that we have biology to blame for what we perceive as bad about the human species, and culture to thank for what we perceive as good about us. I was very fortunate that Frans took me along on this myth-busting ride for so many years. How thrilling and rewarding it has been for me. Frans, I will do my best to do justice to your legacy, but it will be so hard without you. Rest in Peace.

ANN WEAVER

The Dutch Guy

I met Frans when he was studying the bonobos at the San Diego Zoo and I worked there as an educator and keeper. He had already made his name with *Chimpanzee Politics* and may have been disappointed that our bonobos, literally raised to hang out in rooms with select people, showed few of the social machinations of their "common" cousins that so fascinated Frans. Only two of our bonobos were remotely testy. One was Vernon, an outsider male who sought opportunities to harass the kids when he, having checked first, thought no one was looking. He was usually intercepted en route to cuffing a kid by one of the females who without fanfare deflected him deftly. The other was Louise, who was as close to a dominant female as that tranquil society produced. She was just pushy.

Bonobos have sex to calm down. So, Frans took the titillating alternative of studying the complex ways in which our bonobos mated their way to keeping the peace. He was fun. To us, he was "that Dutch guy." He was only some years older than us keepers, but even then seemed very much older in attitude. Not yet imperious, he nonetheless already had that coolness that characterized him over the years. Later, it became a vital tracking mechanism for this student. The moment that cool remoteness turned icy, it was an instant warning that one had blundered onto thin ice and had best backpedal immediately. At the Zoo we were all still young and we partied. When I first joined Frans' new lab at Emory as his second PhD student, it was hard to see him as a superior. He was still just "that Dutch guy." I should have been more reverent.

When Frans was studying the adult bonobos at the Zoo, I was also studying them, but focused on infant development. I don't think Frans valued infant studies—no political intrigue. Yet when I chose to study the development of reconciliation with his beloved capuchins as the model, he was accommodating. His external coolness was warmed by his emphasis on reconciliation—peacemaking in the aftermath of aggression. Peacemaking buttressed a brightness of optimism against the darkness of hostility and attack. Aggression had a greater good. It gave one hope.

Frans was single-mindedly intent on his chimp studies. His edict was compulsive completeness, a tenacity of such rigor that it made me wonder what Frans thought of the distraction of having students to attend to. I never decided but share a vivid revelation. Frans and I both loved birds. I did not have children while under Frans' tutelage. No student at the time dared such blatant expressions that their work might not come first (happily, this intensity softened over time). I got a nestling Amazon parrot instead, who turned out to be every inch my daughter of 28 years. Living across the country from home and husband to attend graduate school, I had the parrot for company at school and went home three times a year to rest and recuperate. I suspect most of Frans' students and chimp keepers recall the need to sneak in rest whenever possible; Frans pulled everything out of you that you had to give and then pulled out more. Whenever I left town to go home, thank God, Frans became my baby parrot's willing babysitter. I was so grateful that she was in good hands. I named the parrot after the seeress in Kahlil Gibran's classic book, The Prophet, a name I had long favored for my next pet: Almitra. Frans did not like this name or, as he claimed, it was too hard to say. In any case, I returned from a rest stop to hear him announce with guiltless triumphant that he had renamed my parrot Rita!

I took the high road, I thought, and acquiesced professionally but personally continued to call her Almitra. One night, Frans and Catherine had students over to dinner, which they did regularly and was always lively. We were seated around the table in the after-dinner glow. Almitra sat on my shoulder for most of the meal. Someone did something that startled her. She burst into the air and flopped down on the table, a jungle splash of bright green and yellow with splayed wings of royal blue and red against Catherine's elegant lace tablecloth. I leapt up and cried, "Almitra!" as Frans leapt up and cried, "Rita!" Busted. I called her Rita from then on.

For all his emphasis on quantification, Frans loved animals. One time after I graduated, Frans and Catherine came to see me at the San Diego Zoo. All my friends either worked there or lived there. We gave our guests the royal tour. All day long we pet cheetahs and held koalas and frothed our hands rubbing pygmy hippos and smelled the fish breath of sleek otters and took our pictures with all manner of exotic animals ("Watch that camel! It's going to spit!"). Our day at the Zoo was as close as I came to seeing Frans like a kid again, a reserved kid, but a kid. The other time he relaxed was when he and Catherine came out on my boat and I introduced them to some of the 472 wild Florida dolphins I study in west central Florida. Two of them, a bonded pair of big bulls who engaged in seaside politics on par with Frans' chimps, accommodated us by taking a mobile nap next to the boat. Frans and Catherine indulged in extended close observation of wild dolphins like never before, hypnotized by the cadence of their nearby surfaces and rhythm of sighing breaths. The sea was such a feral world compared to his chimps; Frans was mesmerized and quite animated that night at dinner.

That Dutch guy went on ahead way too soon to see all that he inspired in others.

CHRISTINE WEBB

I had the privilege of working with Frans both during my undergraduate years at Emory University and later as a post-doc. Having him as a mentor and collaborator was a gift. He always supported my career (and that of so many others), giving me opportunity after opportunity of a lifetime. Frans taught me that love and respect for other animals is not inimical to, but at the heart of, good science. By recognizing our close primate relatives' minds and interests, he saw things about their lives that remained invisible to others. He encouraged his students to follow suit; first observe and get to know the animals, then ask bold questions that consider their subjective experiences.

Despite his renown, he remained remarkably humble, always approachable as a mentor. His guidance was invaluable and infused with optimism and encouragement. He had a playful and open-minded energy which also shone through his research. Because he never took himself too seriously, he was a pleasure to be around. At my first lab meeting in the Living Links trailer, I was very nervous, drinking coffee. Frans sat down about to address the group and uttered his first three words (ever) to me, which were "that's my mug" (I had grabbed a random one from the kitchen, apparently his favorite). It was not rude or intimidating, just direct and honest! Two additional qualities I came to greatly appreciate about Frans's mentorship.

Alongside a large body of creative empirical work were his major theoretical contributions. Frans influenced not just a generation of natural and social scientists but also philosophers. His pioneering efforts in challenging anthropocentrism and advocating for cognitive continuity between humans and other animals have been instrumental in shaping our understanding of animal minds and their implications for ethics and policy. And because he was such an engaging and prolific writer, we have him to thank for bringing these insights to public audiences, giving them a taste of the wonder and awe for the natural world that drew Frans, and so many of us, to science.

In some ways, it doesn't feel like Frans is gone. He had not been a regular physical presence in my life for quite some time—we'd see each other perhaps once or twice a year, either in Atlanta or The Netherlands. Yet his influence was always palpable and remains so; his thinking and ideas loom large in much of my own. Likewise, though Frans may no longer be with us in the physical sense, his intellectual legacy endures. His work has had a profound influence on our field and where I believe it is headed.

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