

Natural Selections

A NEWSLETTER OF THE ROCKEFELLER UNIVERSITY COMMUNITY

CRISPR In Mycobacterium Tuberculosis Rocks the Boat

AUDREY GOLDFARB

Dr. Jeremy Rock heads the Laboratory of Host-Pathogen Biology located on the south side of the River Campus Research Building. Rock studies *Mycobacterium tuberculosis* (Mtb), a bacterium that exclusively parasitizes humans. Tuberculosis (TB) is the leading cause of death from infectious disease, but Mtb biology is still poorly understood.

Rock pursued his interest in Mtb after completing his Ph.D. at the Massachusetts Institute of Technology working with yeast, the exhaustively characterized workhorse of genetics. “I did a Ph.D. in yeast genetics, and I loved it,” Rock said. “The rigor and depth with which you can answer a question in this model organism is second to none. But I wanted to move to an area that was more directly medically relevant, and in which there was a lot of big, unanswered questions.”

Immediately, there were challenges. Yeast doubles once every ninety minutes, and *E. coli* every twenty. To the disadvantage of Rock and his colleagues, Mtb’s doubling time is a full twenty-four hours. “It was not a painless transition,” Rock said. “Everything grows faster than TB. So, if you don’t have sterile technique everything gets contaminated.”

Rock wanted to identify essential genes in Mtb using CRISPR in order to reveal potential therapeutic targets. However, the traditional CRISPR systems used in other organisms did not seem to work in Mtb. It took Rock two years of his postdoctoral fellowship to identify the Cas9 allele that could edit the Mtb genome.

His lab at Rockefeller is now able to identify hundreds of candidate genes from a single CRISPR screen. “We can do 100,000 experiments at once,” Rock said. “We have

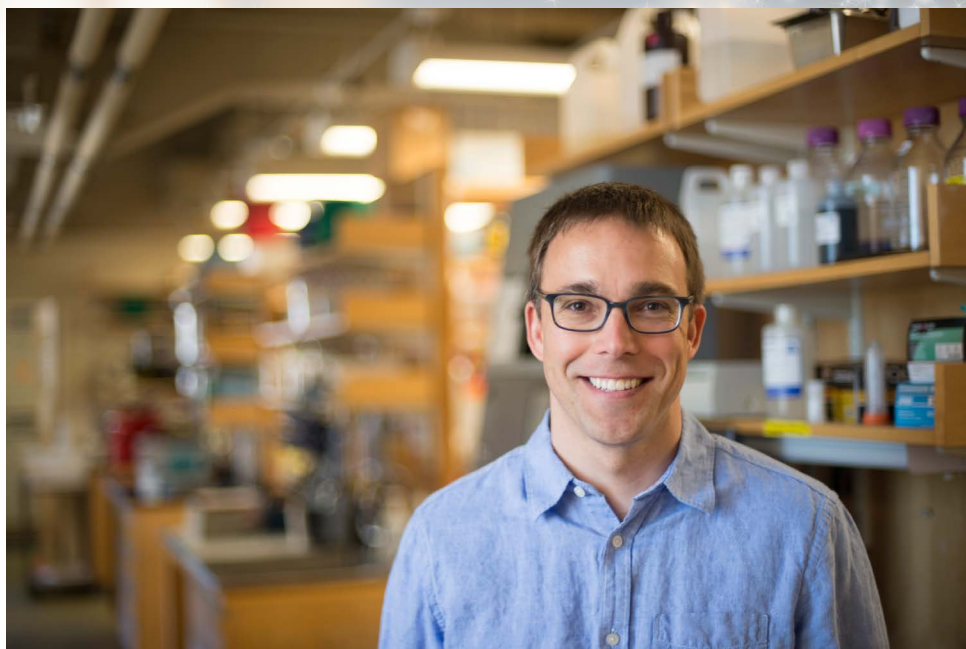


Photo Courtesy of TONY RINALDO

a lot of very interesting hits, and we’re now trying to figure out the biology. This is what we wanted to do with it, and it’s actually working.”

Using CRISPR guides of different strengths, Rock is able to knock down essential genes to varying degrees. This ranks essential genes by their vulnerability: even slight knockdown of some genes in Mtb is lethal, while others require more robust depletion to kill the bacterium. If a gene product requires minimal inhibition to elicit a therapeutic benefit, it can more easily be targeted by drugs.

Though the lab is less than two years old, Rock is already thrilled with the people he has recruited. “They’re a very hard working, collegial bunch,” he said. “Everyone collaborates and helps each other. These are

people I spend a lot of time with, and they’re all people I love being around.”

The lab’s productivity is due in large part to the bioinformatics expertise of computer scientist Dr. Michael DeJesus. “He’s just phenomenal,” Rock said. “The math behind what we’re doing pretty quickly got complicated to the point where we needed someone like him. He was the perfect person to bring in.”

Developing CRISPR in Mtb was a huge hurdle with a huge payoff. “It was slow, it was hard, and it didn’t always work,” Rock said. “But it was clearly a problem that was important, and it was going to open a lot of doors.”

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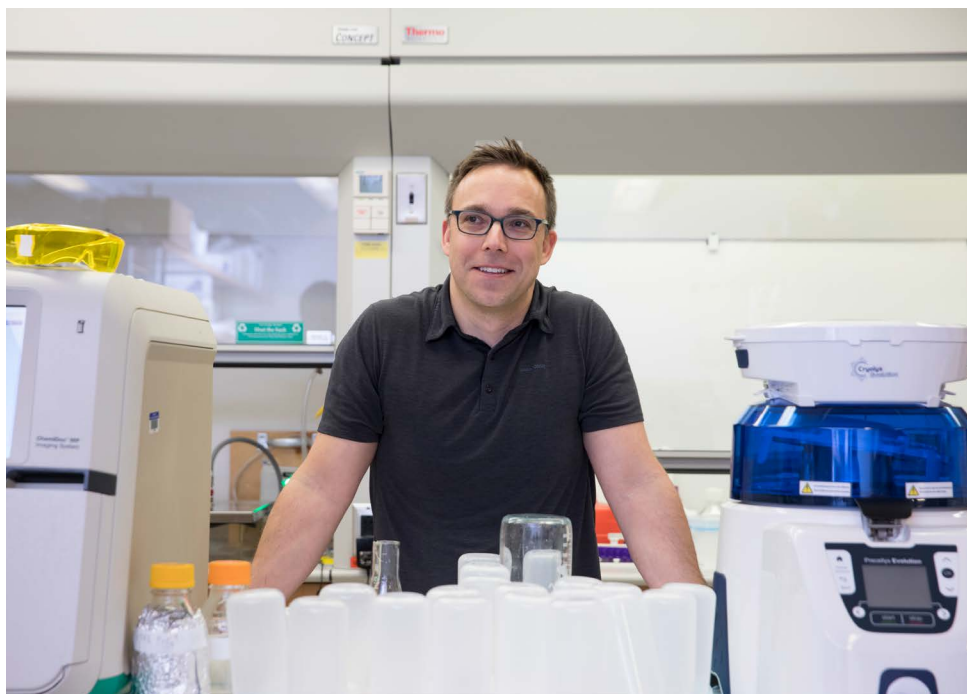


Photo Courtesy of ALEXANDRA ROWLEY

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Rock also acknowledged the support he has received throughout his career, especially as a new faculty member at Rockefeller. “When you start a lab, you have to build it from the ground up,” Rock said. “But it’s not like you do that alone. Both junior and senior faculty were very welcoming, and the administration is amazing. They really take care of you and help you in this process.”

Rock is excited to pursue mechanistic studies to nail down the detailed biology of Mtb. Collaborations to elucidate pathways

and structures may be on the horizon. “We like screening for genes that contribute to interesting phenotypes, and now that we have lots of hits we’re excited about and zooming in on more mechanistic studies,” Rock said.

Meaningful success in science is usually preceded by myriad failures, making hard work and persistence essential even for talented minds. “A lot of this job is just tenacity,” Rock said. “That goes a really long way. In order to be tenacious, you have to really love your project. Science is never easy, but you’ll figure it out.” ■

Natural Selections

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Natural Expressions

Performance

Collette Ryder of The Rockefeller University’s Office of Sponsored Programs Administration will be singing with NYCHORAL on Friday, December 13th at 7:30 p.m. and Saturday, December 14th at 2:30 p.m. at Our Lady of Pompeii Church (25 Carmine St.). The event, “Celebration! A NYCHORAL Christmas,” features Daniel Pinkham’s “Christmas Cantata,” John Rutter’s “Gloria,” Ola Gjeilo’s “A Spotless Rose” and “The Rose,” Franz Biebl’s “Ave Maria,” and an audience sing-along. Children under 12 years old can receive reduced admission for the family matinee on Saturday. Contact Collette Ryder (cryder@rockefeller.edu)

for more information and discounts on tickets.

On Saturday, December 14th at 7 p.m., Lance Langston of the O’Donnell Laboratory and Alison North of The Rockefeller University Bio-Imaging Resource Center will be singing with the Central City Chorus at St. Ignatius of Antioch Episcopal Church (552 West End Avenue). The program features “Mid-Winter Songs” by Morten Lauridsen, the New York premier of “Lux Brumalis” by Nathaniel Adams, and other festive seasonal works. Tickets are \$20 in advance (\$25 at the door) and can be purchased online at the [Central City Chorus website](http://CentralCityChorus.org).

Digital

Bernie Langs of The Rockefeller University Development Office has released a new music video, “How Can You Mend a Broken Heart.” In this latest video, Langs performs music by the Bee Gees and Madonna, acting as both musician and film director. Check out his video here on [YouTube](https://www.youtube.com/watch?v=...).

Email Megan E. Kelley at mkelley@rockefeller.edu to submit your art/music/performance/sporting/other event for next month’s “Natural Expressions” and follow @NatSelections on Twitter for more events.

Giving during the Season of Giving

NATALIA KETAREN

Fall has broken, the nights are getting chillier and the holiday season is fast approaching. For many of us, this is a time for family, giving, and quality time with loved ones. The words “Joy,” “Merry,” and “Spirit” are in abundance. They are a reminder that with this cold, wintry season approaching, we shouldn’t be wintry inside. This holiday season is steeped with virtuous traditions. At the core of them all is a time of reflection, making us thankful for the positive things that have come our way. Often these moments of reflection encourage us to share our giving spirit to our unseen neighbors here in New York City, our neighbors in need.

Here are a few suggestions to give to those in need in NYC during this holiday season:

New York Cares Winter Wishes

In NYC every year, one in ten NYC students experience homelessness. The “Winter Wishes” program run by New York City Cares is a holiday gift drive aimed at providing gifts to children and teens from low-income families. Children and families write “winter wish” letters that are matched with volunteers. This is a wonderful way to spread some cheer this holiday season. Visit <https://www.newyorkcares.org/> for more information.

Hope For New York

I’ve been volunteering with HFNY for many years now. They are a non-denominational Christian organization that is affiliated with many charitable organizations, offering support to our most vulnerable neighbors here in NYC. Their mission is for NYC to be, “...a city in which all people experience spiritual, social, and economic flourishing through the demonstration of Christ’s love.” Their website allows you to navigate through their many opportunities, which range from educational support for low-income individuals, to assisting with meal services for the needy. Visit <https://www.hfny.org/> for more information.

Coat Drives

We all know the necessity of a warm coat during this holiday season. There are many places in the city to donate a gently used coat you’ve lost need of. New York Cares has an annual coat drive with many drop off location throughout the city. Additionally, the New Museum partners with their neighbor, The Bowery Mission, to collect coats and shoes for those in need, which usually spans the end of November to the end of December. Those who donate typically get free admission to the museum. You

can also drop your coat and shoes (and any other clothes you may no longer need) directly at The Bowery Mission, which is right next door. Visit <https://www.newyorkcares.org/coat-drive> and <https://www.newmuseum.org/pages/view/neighborhood> for more information.

For direct drop-offs at the Bowery Mission, visit 227 Bowery, New York, NY 10002 (open 24 hours)

God’s Love We Deliver

Many of our sick neighbors in NYC find it difficult to afford healthy meal options. “God’s Love We Deliver” cooks, prepares, and delivers nutritious, medically tailored meals for those too unwell to do so for themselves. You can donate on their site or get involved directly by volunteering with them. Visit <https://www.glwd.org/> for more information.

These are just a few ways to give this holiday season!

Final note: there can be a tendency to be overwhelmed this time of year. One thing to remember is that there is no small gift—if it comes from a place of kindness.

Happy Holidays and Merry Christmas! ■

More Wine, Please

TRACY ADAMS

If you’re like me and absolutely love the Christmas and New Year’s holidays, then this is the time of year that we’ve all been waiting for. There are certain things that are synonymous with Christmas and the holiday seasons, such as city streets lined with holiday decorations of bright lights and festive garlands, storefronts exuding aromatic spices and savory aromas that permeate the normally foul smelling air, velvety smooth chocolates at every turn, and loads of wines and spirits in every size, flavor, and variety. It’s the one time of the year where conservative portions are ill-advised and more (not less) is delightfully anticipated and accepted.

Along with the holiday season comes traditions and favorites (old and new), including everything from handed down family recipes of savory goodness to century old timeless staples. Wine has been in existence since as early as 7000 B.C. from Asia to Europe to the Americas. Fermented drinks have become a symbol of transformation and have been referenced in literary works as signs of happiness, luxury, and friendship.

Mulled wine, also known as spiced



Photo Courtesy of TASTY BITES

wine, first made its appearance in the 2nd century A.D. by the Romans as an effort to warm the body during cold nights. By definition, “mulled” means to heat, sweeten and flavor with spices. By process, it is a red wine that has been treated, heated and sifted to harmoniously marry spices such as cinnamon, anise and cloves with hints of orange flavor (if desired). Mulled wine can be served hot or warm and can be found in both alcoholic and non-alcoholic varieties. Although it can be enjoyed anytime, it is a popular beverage made throughout Europe

mostly available around Christmas. Mulling spices are not limited to wines—they can also be found in mulled cider or ale, when the spices are added during the brewing process to make spiced beer.

It has been said that one should “take a little wine for the stomach’s sake,” but it has also been noted that mulled wine might have some health benefits similar to red wine.

For year-round indulgence, try the following recipe:

INGREDIENTS

- 1 (750 ml) bottle of dry red wine
- 1 orange, sliced into rounds (also peeled, if you would like a less-bitter drink)
- 8 whole cloves
- 2 cinnamon sticks
- 2 star anise
- 2–4 tablespoons sugar, honey, or maple syrup to taste (or your desired sweetener)
- optional add-in: 1/4 cup brandy (or your favorite liqueur)
- optional garnishes: citrus slices (orange, lemon and/or lime), extra cinnamon sticks, extra star anise

For full recipe check out: <https://www.gimmesomeoven.com/mulled-wine-recipe/> ■

How to Eat Takeout and Stay Healthy

ANNA AMELIANCHIK

Popeyes Chicken Sandwich triumphantly returned to the fast-food chain on November 3, causing nearly as much frenzy as it did when it was first released in August. What is it about the coveted sandwich that makes customers turn to violence in the face of sandwich shortage? The answer may be found in the nutrition facts. Popeyes confirmed to *Healthline* that at 690 kcal, each sandwich contains a whopping fourteen grams of saturated fat and 1,443 milligrams of sodium—more than half of the recommended daily sodium intake limit. Although the taste is highly rewarding, the overabundance of salt and grease is what contributes to poor health outcomes such as obesity, diabetes, and cardiovascular diseases. In addition to salt and fat, the typical American diet goes above the recommended limit for the intake of added sugars while lacking in fruit and vegetables and, as a result, dietary fiber. Interestingly, foods perceived as neutral or even healthy (such as sauces and condiments, frozen foods, and some cooking oils) may contain an excess of sodium, saturated fat, or added sugars, and tip the scale in the direction of unhealthy eating patterns. Although the best way to avoid such foods is to cook all of your meals at home, in a city like New York where takeout options are numerous and the pace of life does not leave much time for food preparation, it may not always be feasible.

To help our community make healthier choices when ordering restaurant meals, the Department of Human Resources at The Rockefeller University invited Arielle Leben, a Registered Dietician from New York University Langone Center for Cardiovascular Disease, to give a talk as part of the Wellness Lecture Series. According to Leben, building a balanced plate is key to ensuring your takeout choices promote your overall health. The Harvard T.H. Chan School of Public Health recommends the following breakdown for a healthy balanced plate: 25% lean protein, 50% vegetables and fruits, and 25% quality carbohydrates. The focus on lean proteins (skinless chicken or turkey, fish, or eggs), fiber-rich vegetables and fruits, and whole grains will ensure your meal will keep you full without causing your blood sugar to spike. Leben also adds that the addition of healthy fats, such as olive oil or avocado, will promote good health when consumed in moderation.

The method of preparation of your meats and vegetables can also make a dif-

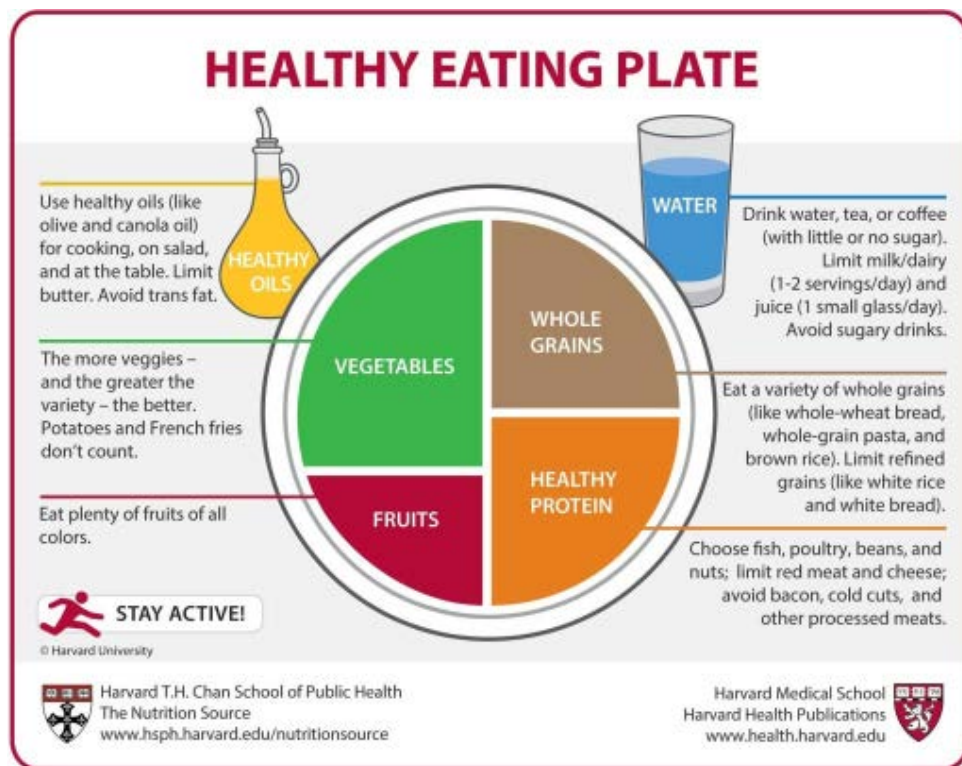


Image Courtesy of HARVARD MEDICAL SCHOOL

The Healthy Eating Plate can be used for creating healthy, balanced takeout meals. For more information about The Healthy Eating Plate, please see The Nutrition Source, Department of Nutrition, Harvard T.H. Chan School of Public Health, <http://www.thenutritionsource.org>, and Harvard Health Publications, <http://www.health.harvard.edu>.

ference for your health. Leben recommends avoiding anything that is fried, crispy, crunchy, battered, buttered, or creamy and choosing steamed, boiled, poached, grilled, or roasted foods.

If you opt for vegan meat alternatives, be aware that your choices might be significantly higher in saturated fat and sodium when compared to animal sources of protein. For instance, a four-ounce Impossible Burger contains two grams more saturated fat and nearly five times more sodium than 85% lean ground beef. When choosing your vegetables, remember to pick the non-starchy kind to avoid overloading on carbohydrates. However, when it comes to carbohydrates, quality is just as important as quantity. Although carbohydrate needs may vary depending on your activity level and weight goals, choosing whole grains, such as brown rice or quinoa, is key to achieving a nutritional balance. In addition to balance, portion size is key whether your goal is to shed some pounds or maintain your healthy weight. Leben recommends using an appetizer plate to determine the correct portion sizes for your meals and asking for takeout containers for the food that exceeds what your body actually needs. Another tip for making your takeout meal healthier is to ask for dressing and

sauces on the side. This way, although you may not have control over the sodium or the sugar content of these foods, you will be able to control how much of them you add to your diet.

Finally, the pro tip for making every restaurant dish a healthy option is to ask questions about your food and to not be afraid to make substitutions. “You will be surprised once you start asking [questions]. I was at a Mediterranean restaurant a few months ago,” says Leben, “and you would think Mediterranean food [would have] olive oil, of course. Everything was made in butter! I could not find a vegetable that was not made in butter.” When it comes to substitutions, skipping French fries and ordering half of a baked sweet potato or asking to replace buttered vegetables with steamed/lightly sautéed ones are good ways to make sure your side dish does not throw off the balance on your plate. Regardless of whether your go-to is Chipotle or sweetgreen, these simple instructions will ensure your diet works to promote your overall health:

1. Increase your fiber intake by loading up on non-starchy vegetables (greens, fajita vegetables, and black beans have the Registered Dietitian's stamp of approval).
2. Pick lean proteins and skip processed

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- meats (e.g. chorizo) and meats high in saturated fat (e.g. steak).
- Do not skip carbohydrates. Quality choices like whole grains (e.g. brown rice) or starchy vegetables (e.g. sweet potato/butternut squash) will keep your full for longer.
 - Choose 1-2 servings of healthy fat (avocado, nuts, or cheese).
 - Don't be afraid to add flavor with hot sauce, salsa, or "light dressing" like a squeeze of lemon or red chili flakes.
 - Say no to packaged sides (e.g. chips), cookies and soda, all of which will add calories without adding much nutrition.

When it comes to foods that are commonly perceived as unhealthy, Leben recommends exercising portion control and carefully thinking about how the ingredients add to the nutritional composition of these foods. For example, pizza lovers will be happy to find out that you can maintain your weight and promote your health if you choose thinner crusts or opt for whole wheat or cauliflower crust substitutions, go light on cheese, and try to not overindulge. Pizza toppings are also key to ensuring your love for pizza does not compromise your health: add vegetables (e.g. spinach, mushrooms, green peppers) and avoid processed meats (e.g. pepperoni, sausage, bacon).

The last piece of advice from Leben

may be obvious, but it is too often overlooked: cut out sugary beverages (containing either real sugar or artificial sweeteners) and drink a lot of water. Dehydration can have negative consequences on various aspects of your well-being, but increasing your fiber intake without also increasing water consumption will lead to gastrointestinal distress.

If at this point you still find yourself thinking about the Popeyes Chicken Sandwich, we have the good news for you. "I totally think there are times to enjoy those foods!" says Leben. "This is the everyday stuff that is going to contribute to our cholesterol panel, our hemoglobin A1C and all of that!" ■

New Year's Eve in NYC

EMMA FILGATE

New Year's Eve marks the start of something new and the bittersweet goodbye to the past presented in just a one-minute long countdown. The world holds its breath as one year becomes the next. Neighbors shout, "See you next year!" to each other on December 31st as if it is their first time saying it. Cities mark the occasion across the world with fireworks and all kinds of celebration. When people think of New Year's Eve in the United States, New York City is the first thing that comes to mind. Every New Year's Eve Times Square is packed even tighter than normal. Eager, rosy faces ignore the chill in the air and countdown along with families snuggled up on the couch watching the festivities from their televisions. This New York tradition has been in practice since 1907 and has become a solid part of New York's history. The crowd in Times Square feels the electric energy in the air as the ball drops inch by inch.

New Year's celebrations actually started 4,000 years ago in ancient Babylon civilizations according to the HISTORY CHANNEL. Originally the new year was celebrated in March until Julius Caesar introduced the Julian Calendar marking January 1st as the official start of the new year. Janus the Roman God (for which January is named after) has two heads. This gives him the ability to look towards the future while also looking back on the past.

We have come a long way from the first New Year's Eve, but one thing remains the same—it is a time for people to reflect on the past year. This includes the good moments, the bad times, and the hopeful ways we can im-



Photo Courtesy of JOHN MINCHILLO | ASSOCIATED PRESS

prove upon them in the upcoming year. Just like Janus, we look in both directions of our lives. Living in New York City makes it easy to keep going and going without taking a break, but there is something special about taking a moment to celebrate the past and embrace the future.

On the other hand, there is an undeniable pressure that everyone feels when it comes to New Year's Eve. Add in the fact that we live in the city that never sleeps—the pressure is really on to do something fun. Maybe it is how it is represented in movies, but the romanticism of New Year's Eve is alive and well, even in 2019. While some may feel the need to go out, others are desperate to stay in away from the pushy crowds, cold winds, and tourists. One has to wonder, what makes New

Year's Eve so great? What makes it turn so terrible some years?

At the core of New Year's Eve lies this: even the loneliest feel hope. The new year is a new start. The winter snow covers the city, providing a perfect clean slate over everything it touches. For a brief moment—the clock stops, and the world takes a collective pause. The only sound that can be heard is the last inhale of breath before the year starts once again. By the time the exhaled breath turns into steam on screaming lips, the new year is here. It is time to begin again. That is the magic of New Year's Eve and why we try so desperately every year to capture it. When the magic of New York City and New Year's Eve collide even for just a brief moment, all we could hope for is possible. ■

Resolutions? Goals? Let's Talk New Year!

GRETCHEN M. MICHELFELD

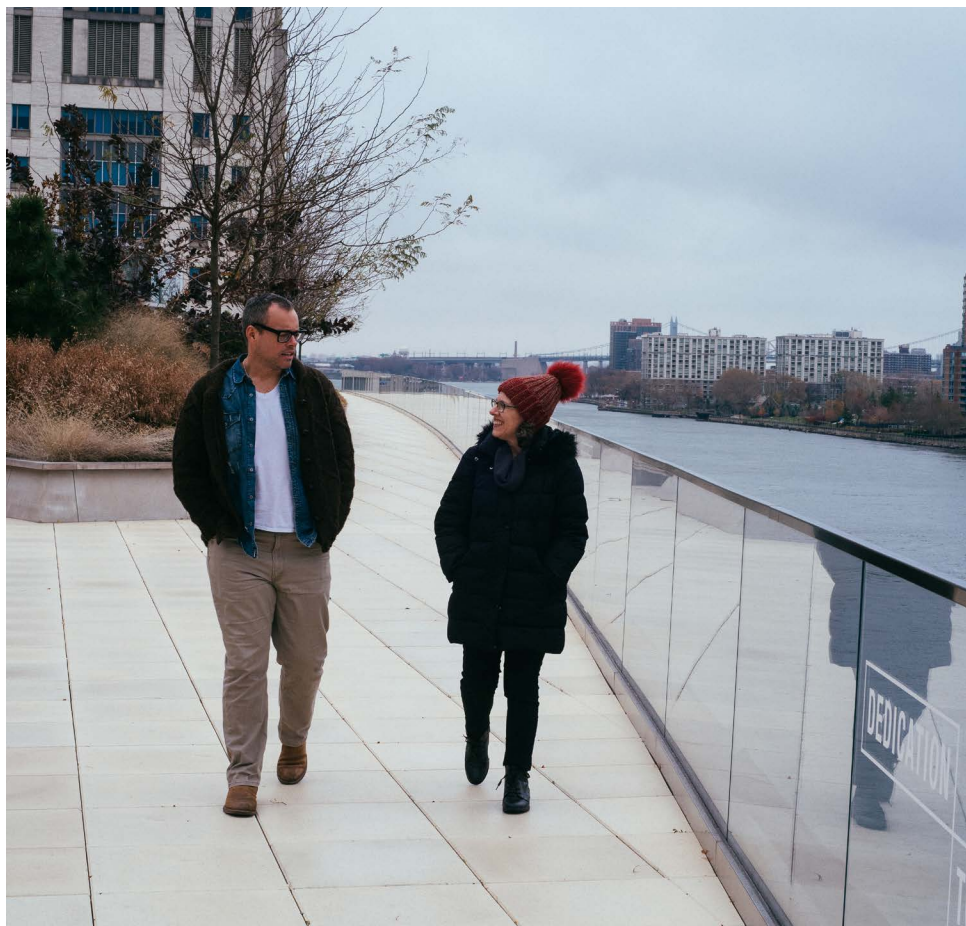
According to a 2015 study by *U.S. News & World Report*, 80% of New Year's resolutions fail and most people abandon them by the second week of February. Many of us start off with the best of intentions, inspired to finally lose that weight, take up a new hobby, save more money, or drink less alcohol, only to give up on our aspirations fewer than fifty days later.

Perhaps that's why so many folks in the Rockefeller University community have resolved to give up resolutions all together. Over half the participants declared themselves "not resolution people" in an informal campus survey. "I gave up making resolutions long ago," said one anonymous respondent. "Each day is an opportunity to improve," said another.

But for those of us who do wish to make a fresh start in 2020, the trend these days seems to be toward setting goals. "Instead of resolutions, I have specific things I want to do every year: a list of books I want to read, a trip I want to take, and one personal goal I want to accomplish," said Adriana Barillas-Batarse, Senior Program Manager of Clinical Programs at the Vaccine Center. In 2019, she read (among others) five books she had set her sights on reading, took a trip to Japan, and accomplished a very special personal objective—after years of concentrating on other priorities, she started writing again.

Jennifer Groves, Program Manager for the Department of Research Support, has a similar preference for goals over resolutions. "I no longer make New Year's resolutions," declared Groves. "I've found most of my resolutions impossible to commit to. They've seemed like penance for the past year instead of actions to gain a positive reward. When I decided to reframe them into written ideas and goals for the coming year, I felt better about the whole 'resolution' thing. Now I ask myself, 'What am I striving for this year?' Each year I get quiet, and I write it all down." Sometimes Groves will find that her aspirations change as the year goes on, but it's often the case that when she checks in with herself during the year about those goals, they have already been attained.

One person on campus who has not given up on the good old-fashioned New Year's resolution, is R.U. Fitness Manager, Timothy Blanchfield. Blanchfield has robust anecdotal evidence to support the discouraging *U.S. News & World Report* study. In fact, Blanchfield has observed that most folks who resolve to lose weight in the New Year start working



EVAN DAVIS | NATURAL SELECTIONS

The author enjoys a River Campus walk with Evan Shoemake of the Kreek Lab.

out in January and don't even make it to February! Tim has some stick-to-it tips for those of us who have decided to get in shape in 2020.

Blanchfield believes it's crucial to make a resolution, set a firm start date, and hold yourself to it. "The trick is to have a plan not just some vague aspiration," he said.

And for Blanchfield, the best way to stay with the plan is to commit to an event.

"Commit to running a 5K. Find a race, register for it, and start training," suggested Blanchfield. "If you're going to run a 5K race in five months, you need to start working out five days a week right now. This is a great way to keep moving—work towards something tangible and specific."

Need more or less of a challenge? Blanchfield maintains it's not important what event you choose as long as you pick one and stay with it. "A charity walk, an Ironman triathlon, a half-marathon... find the right event for you, the right location, and the best timing. Tell yourself that this is what I have to get ready for."

I asked Blanchfield if he could suggest any other resolutions that might complement a New Year's fitness resolution.

"Longevity studies consistently indicate that the key to living a long and healthy life is to stay connected to other people," said Blanchfield. "This year, make a resolution to nurture relationships. Joining a book club or taking a class with a friend might lead to a healthier lifestyle. Maybe you'll meet a workout buddy or you and your friend walk to class together. Plan a group walk through Central Park—in interpersonal relationships create activity."

Nurturing relationships definitely paid off for Barillas-Batarse when she resolved to start writing again. She and a pal signed up for some free creative writing workshops together. Sharing your goals or resolutions with others helps you stay accountable. And being more in touch with family and friends is also a very popular New Year's resolution.

So is saving money. According to Inc. Newsletter, resolutions to get out of debt or save more for retirement top the lists of most Americans every year.

Wellness, relationships, personal finance—whatever your goals for 2020, making a date with a friend to do the Rockefeller River Campus walk a few times a week is a resolution that is healthy, nurturing, and free of charge. I'll see you out there! ■

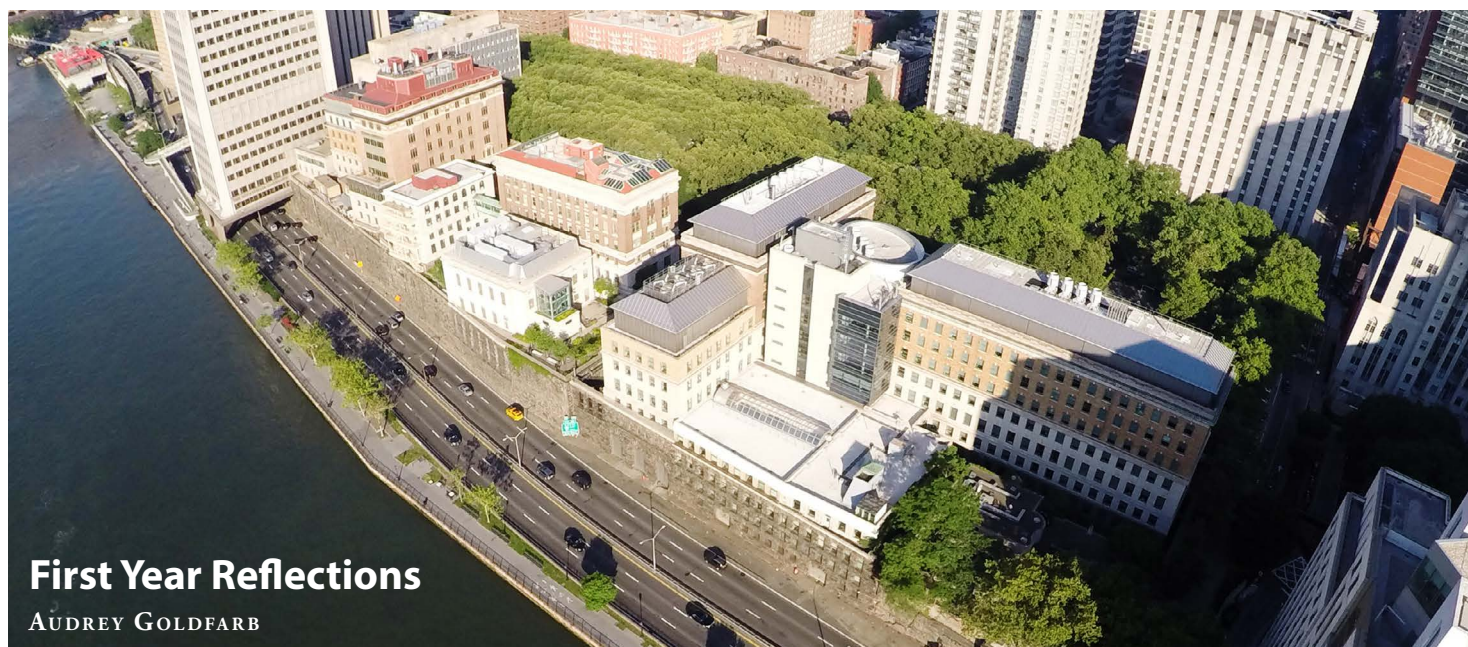


Photo Courtesy of THE ROCKEFELLER UNIVERSITY

First Year Reflections

AUDREY GOLDFARB

Unbelievably, less than a month remains in the 2019 fall semester. The last few months have been a whirlwind of rotations, classes, and transitions for the first-year class. Though Rockefeller students tend to present as confident, curious, and well-adjusted people, few painlessly sail through the first year (or subsequent years for that matter). I gathered anonymous reflections from a sample of first-year students, many of which echo each other.

Though the freedom of the Ph.D. program at Rockefeller was a major draw for members of the 2019 first year class, the unstructured nature of the classes has been an adjustment for some. Rockefeller's curriculum is advertised to have few mandates and still offer courses instructed by world leaders who genuinely care about teaching. The actual content and structure of the individual courses is not extensively discussed during recruitment, which may contribute to unmet expectations.

"The biggest surprise for me starting grad school at Rockefeller were the classes, or the lack thereof. By lack I don't necessarily mean like lack of actual classes to take, more like how un-stringent the classes so far actually are."

"I will admit that part of the draw for me was knowing that I could get to take the classes I was most interested in while circumventing some of the ones I wasn't. But I didn't realize that that would also translate into classes that are way less structured than I was used to."

"I knew beforehand that the classes were very relaxed, but I think this allows

us to actually care about learning and not worry about getting a passing grade, which we all know how to do."

Rockefeller students are allowed the freedom to pursue research in fields in which they have no experience but are generally expected to acquire the fundamental knowledge of that field independently. Classes don't offer extensive background information before delving into complex concepts and modern research. This proves to be a formidable challenge, especially while balancing classes and productivity in the lab. However, this process is a key part of independent research, and developing a degree of self-sufficiency is valuable in the long run. Some first-year students already feel their hard work paying off.

"I was hoping that the classes I was interested in would've started out by giving me that background and then bringing in guest speakers to talk more in depth about their topics and then I would be able to engage with the material better after having that first introduction. ...I'm trying to transition into a completely new field from my previous experiences and I was kind of counting on the classes to help ease my way into that transition."

"I wasn't able to get as much out of the talks as I could've because I didn't start with a solid foundation of the subject, so many of the seminars I spend just trying to catch up on background."

"Going into a general bio program after doing research in a pretty specific

subfield of biology was challenging at first—I felt like I was often missing something in class and have had to relearn plenty of material. I do think this has been rewarding, because I feel ultimately more prepared to understand all facets of the research in my field."

"Since I started my PhD program at Rockefeller, I have been experiencing elevated feelings of excitement coupled with huge responsibility. My excitement stems from being at this amazing institution with limitless opportunities to learn and thrive on the academic and personal levels; however, it is up to me really to decide to what extent I will be growing at this new stage. In the first couple weeks, I have been mentally transitioning from being an undergraduate student with a packed schedule of classes and exams to being a graduate student with a more flexible schedule and no rigid requirements for classes and lab work. This flexibility, although very useful, can be scary sometimes if I don't make use of my time efficiently. I have been also learning to set my own short-term goals and evaluate myself periodically. It is worthwhile to mention that the environment at Rockefeller as an institution and in my lab are very conducive of learning and adjusting at my own pace."

Textbook discoveries made at Rockefeller laid the foundation for decades of incredible discoveries, and the University's history continues to inspire this genera-

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tion of scientists.

“I think the history and the impact of this place keeps hitting me when I least expect it. I’ll be going about my day and remember I’m walking past the same building where Avery, McCarty, and MacLeod figured out DNA was the heritable material.”

“I’ve gotten to hear really incredible scientists give talks in my classes.”

“One of the things I have been enjoying about being at RU is the enriching scientific community between RU, MSKCC, and WCMS. I have the chance to listen to outstanding scientists in different fields from all over the world and learn from them. Also, the organized breakfast and lunch events with some of the speakers at RU are a good chance to hear their perspectives and discuss common issues in the scientific community. These events are also potentially very useful in expanding our network and building connections.”

“So much of textbook biology was written here. The research I spent my entire undergrad on was pioneered here—and I’ll remember that while I’m in sweatpants on the couch, eating an entire tin of Trader Joe’s *dolmas* straight from the can.”

As with every transition, starting graduate school in a new city comes with many challenges. Building a new support network of friends and colleagues is made easier by the welcoming environment at Rockefeller.

“My biggest fear when moving to New York to start graduate school at Rockefeller was leaving everything that was familiar behind, including friends and family. However, everyone here has been super supportive and the friends that I have made here are like my second family. I was surprised at how well I was able to actually adjust once I got here, and the people at Rockefeller played a huge role in that. Although, I am still incredibly intimidated being at an institution with such a high scientific caliber, I don’t regret my decision coming here.”

“From the first day at RU, the environment has been welcoming at every level. The orientation week was a great time to talk to my colleagues and get to know them more and also to get to know the Dean’s Office and university staff. Also, the various student and science re-



Photo Courtesy of THE ROCKEFELLER UNIVERSITY

treats have been a great chance to learn more about the science and the people at RU. I think this gave me a chance to build a close community of colleagues, which is very important to me.”

“I feel fortunate to be friends and colleagues with members of the first year class. Their curiosity, diversity of expertise, and ability to be comfortable with their own ignorance fosters a stimulating and supportive atmosphere. Owing to this class, I am comfortable calling Rockefeller my home. I am looking forward to seeing where their interests take them and to celebrate their successes in and out of the lab.”

“The transition back to research and into the PhD after clinical rotations in med school was a welcome break in the pace of my daily life. But what surprised me the most about trying to re-integrate into the research world was how afraid I had become [of] asking questions. The hierarchy and intense grading schemes of clinical rotations had now taught me to be afraid of seeming stupid when asking questions in the hospital. However, this fear had integrated much more deeply than I ever suspected. Luckily, the more I’m around my peers and lab members at Rockefeller, the more I’m realizing there is nothing to be afraid of. I’m consistently in awe of the research ideas that develop from questions asked in casual conversations or in lab meetings. As I work on slowly getting back to being a confident question-asker, I feel really lucky to be in the intellectually curious

environment fostered by the community here at Rockefeller.”

“Overall, I am pretty happy with the experience and the program. I feel that our year has a good mixture of people from different backgrounds and whenever they voice their opinion on data and experiments, I’m learning too.”

Of course, there are exceptions, and word travels fast about the hostile reputations of some labs.

“...I’m not rotating with them because I know this from fellow students, so I think there should be something done about it since their research is pretty cool and keeps away many students (I’m sure it’s not only me).”

The amenities Rockefeller offers to its graduate students are the cherry on top. As advised by older students, we are enjoying the free bagels and coffee while they last.

“In addition to the science seminars, I am really enjoying the Peggy concerts hosted at RU. I view these concerts as a chance to enjoy the taste of music and just relax after a long lab day.”

“When I started graduate school at Rockefeller, I knew it was the place for me. Not really because of the fabulous community within my first year cohort, or the wonderful community of driven and excellent scientists, but because of the plentiful and bountiful opportunities to eat free food. There have been weeks where I was able to get gourmet lunch 4/5 days, without spending a penny. What a luxury!” ■

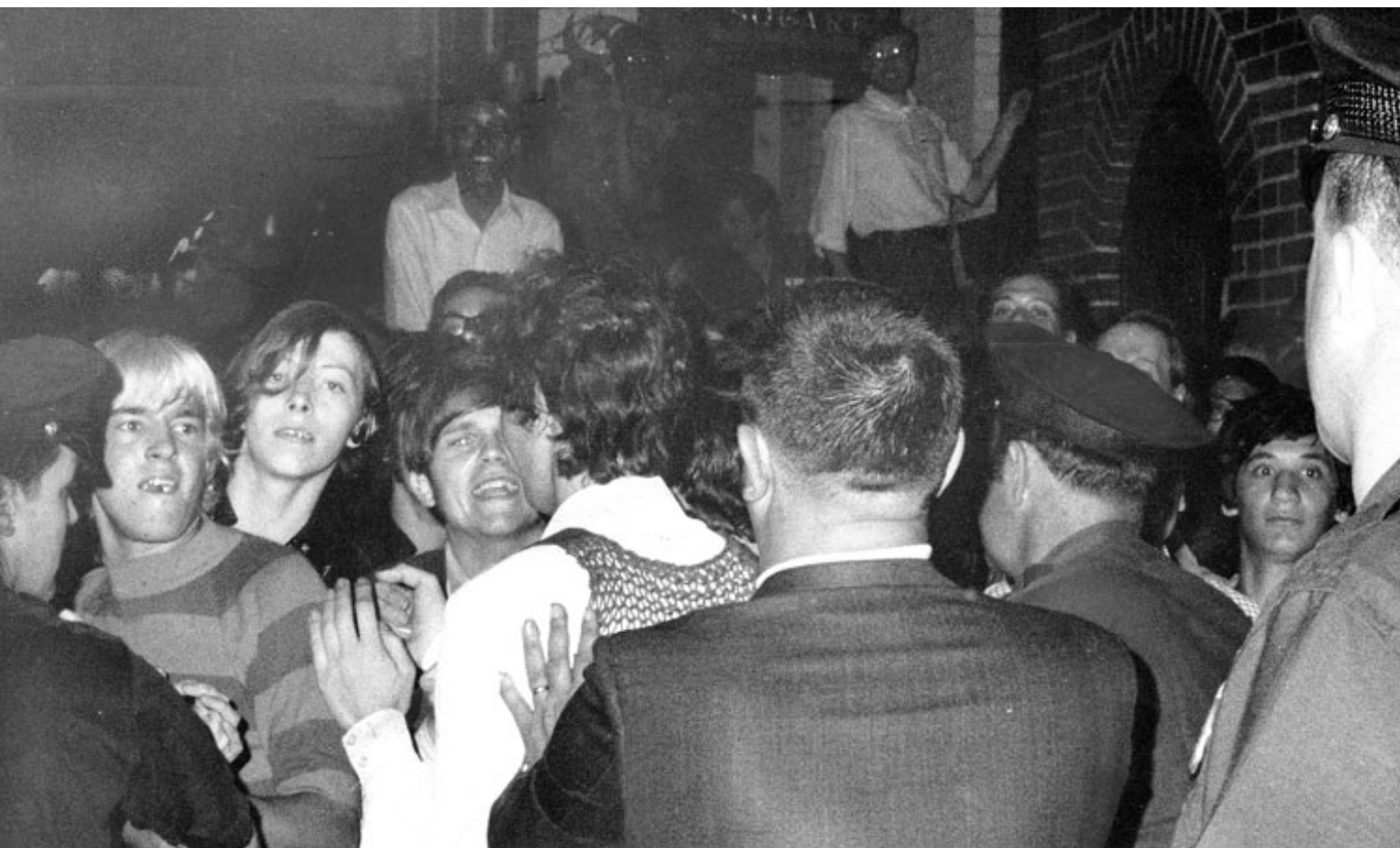


Photo Courtesy of NY DAILY NEWS ARCHIVE | GETTY

Stonewall Inn on June 28, 1969.

The Stonewall Inn 1969: Fifty Years and Beyond

NAN PANG

With 2020 fast approaching, it is the time of year for end of year reflections. This year marked the half-century anniversary of some significant events in modern American history. While Neil Armstrong was taking one giant leap for mankind on the moon in 1969, back on Earth, a hairpin drop from Greenwich Village was heard around the world. The Stonewall riots are a significant turning point in the modern LGBTQ+ movement, and its legacy of struggle and triumph continues to impact the world today.

The History

The living situation for LGBTQ+ people in the 1960s was far from ideal. At this time, employment discrimination towards LGBTQ+ people had not yet been criminalized, and some were still arrested for their same-sex relationships citing state sodomy laws. In fact, in nine states, sodomy laws were explicitly rewritten so that

they [only applied to gay people](#). Although New York City offered the LGBTQ+ community a small taste of freedom, it was still oppressive. Gays in New York formed a community around Christopher Street in Greenwich Village despite the common police raids of pro-LGBTQ+ bars in the 1960s. In June 1969, however, something changed. The patrons at the Stonewall Inn had finally had enough. Their fury from echoed across the US and became a liberation movement.

“
...she looked at bystanders and shouted, “Why don’t you guys do something?”

AN UNIDENTIFIED TRANSGENDER WOMAN

On June 28, 1969, as the clock struck a quarter past one, eight police officers raided the Stonewall Inn. “Police! We’re taking the place!” Over 200 people were at the bar that night—chaos erupted as many started to flee the scene, but the police blocked the doors. “Things happened so

fast you kind of got caught not knowing. All of a sudden there were police there and we were told to all get in lines and to have our identification ready to be led out of the bar,” says Michael Fader, who was at the Stonewall that night.

However, the raid did not go as initially planned. Normally the bystanders would just watch as the police made arrests—a typical scene at a gay bar raid back then. That night at Stonewall, something unprecedented happened. Whether it was a hairpin, or a coin, or a brick, something was thrown at police from the crowd. Then a transgender woman in handcuffs was escorted from Stonewall while she fought with four of the police. As she had been hit on the head by an officer with a baton, she looked at bystanders and shouted, “Why don’t you guys do something?” The scene exploded and quickly became a massive riot as bar patrons, bystanders, and police became more aggressive and violent. That night, one small pebble thrown at injustice caused hundreds of ripples, which eventually became larger waves in the LGBTQ+ liberation movement.

CONTINUED TO P. 10 21

The Legacy

Since the Stonewall riots, June has become a month of celebration for the LGBTQ+ community. On June 28, 1970, which marked the first anniversary of the Stonewall riots, [over 5000 women and men marched](#) from Christopher Street to Central Park, which marked the first Gay Pride march in U.S. history along with satellite marches in Los Angeles and Chicago. In 1971, Gay Pride marches also took place in Boston, Dallas, Milwaukee, London, Paris, West Berlin, and Stockholm. By 1972, the participating cities expanded to Atlanta, Buffalo, Detroit, D.C., Miami, Minneapolis, and Philadelphia, as well as San Francisco.

This is when the same-sex marriage movement began in the US with [Baker v. Nelson](#) seeking legal recognition of same-sex relationships. Although the *Baker v. Nelson* plea was unsuccessful, it served as a stepping-stone to further legal challenge as the Supreme Court suggested the possibility that the state's prohibition might be unconstitutional. This decision caused a stir in public discussion, as well as increased awareness of the movement in the United States. The same-sex marriage rights movement finally came to fruition in Massachusetts in 2004. Same sex marriage was legal in two states in 2008, eight states and D.C. in 2012, and eventually in 37 states. While this movement was a victory for same-sex couples, it also provoked a reaction from opponents of same-sex marriage, which resulted in lawsuits in certain states that still denied marriage licenses to same-sex couples. On June 26, 2015, the U.S. Supreme Court in *Obergefell v. Hodges* [struck down all state bans on same-sex marriage](#) and finally brought marriage equality to all fifty states. While this Supreme Court decision recognized marriage equality across all states, Justice Anthony Kennedy embodied the quintessence of marriage in the final paragraph of his opinion, emphasizing why LGBTQ+ people have fought so hard for same-sex marriage:

"No union is more profound than marriage, for it embodies the highest ideals of love, fidelity, devotion, sacrifice, and family. In forming a marital union, two people become something greater than once they were. As some of the petitioners in these cases dem-



The Christopher Street Liberation Day March on June 28, 1970 — the first anniversary of the Stonewall uprising.

Photo Courtesy of MICHAEL EVANS | THE NEW YORK TIMES



Photo Courtesy of HERITAGE OF PRIDE

WorldPride NYC. June 28, 2019.

onstrate, marriage embodies a love that may endure even past death. It would misunderstand these men and women to say they disrespect the idea of marriage. Their plea is that they do respect it, respect it so deeply that they seek to find its fulfillment for themselves. Their hope is not to be condemned to live in loneliness, excluded from one of civilization's oldest institutions. They ask for equal

dignity in the eyes of the law. The Constitution grants them that right."

Stonewall: Fifty and Beyond

In June of this year, New York City hosted WorldPride during the fifty-year anniversary of the Stonewall riots. [The New York Post reported](#) that "there were about 150,000, or twice the usual num-

ber of participants marching down Fifth Avenue this year, easily the most ever.” At the same time, there was an estimate of “another more than 2.5 million, or greater than the typical number, showed up along the sidelines to cheer them on.”

The LGBTQ+ rights movement in the US has made significant progress since the Stonewall riots. Today, we benefit from LGBTQ+ rights secured by our predecessors’ fierce fight for the past fifty years and before. [Recent Gallup polls](#) show that the United States has made some dramatic shifts in LGBTQ+ acceptance in 2019 since its first poll in 1977. While LGBTQ+ rights advocates can count many victories in recent decades since the Stonewall riots, there are still areas where activists seek improvements.

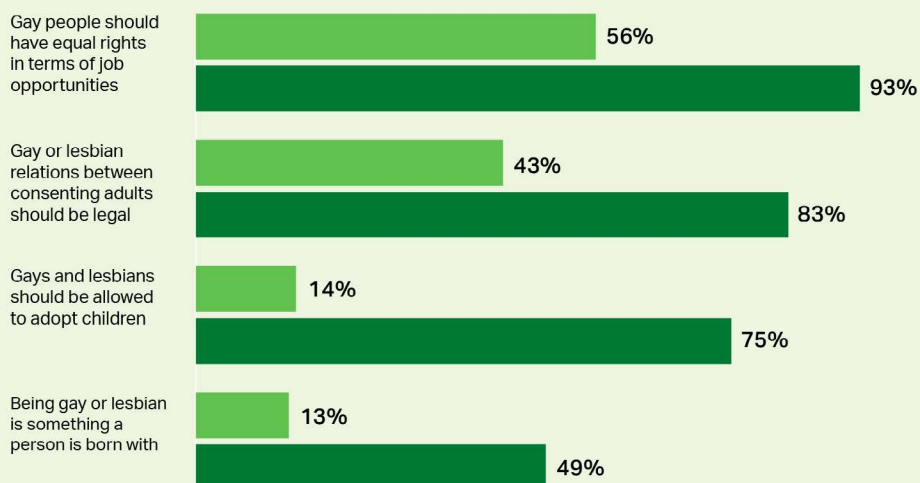
For instance, although society has become more accepting towards the LGBTQ+ community, as the poll indicates, LGBTQ+ youth still face rejection and discrimination. [They are five times more likely to have attempted suicide](#) as their peers. In more recent events, despite the fact that [the overwhelming majority of Americans \(71%\) support](#) transgender people in the military, the current administration instructed the Armed Services to begin [discharging transgender service members](#) effective April 12, 2019.

As we acknowledge and appreciate our predecessors’ tremendous struggles, efforts, and victories, we must also think about what we can leave behind for future LGBTQ+ generations. While activists and advocates address such issues tirelessly, we as a society sometimes underestimate the power of our own voices and actions. The Stonewall Inn became a beacon of hope for the LGBTQ+ movement and proudly still stands. Its neon light has been, and will be, navigating us toward the courage to speak up and will give us the tenacity to fight injustice, just like that single hairpin fifty years ago shaped the society that we know today. ■

Editorial Note: this article was originally published in for the Memorial Sloan Kettering Cancer Center LGBTQ+ Pride Employee Resource Network Newsletter and was revised by the Natural Selections Editorial Board.

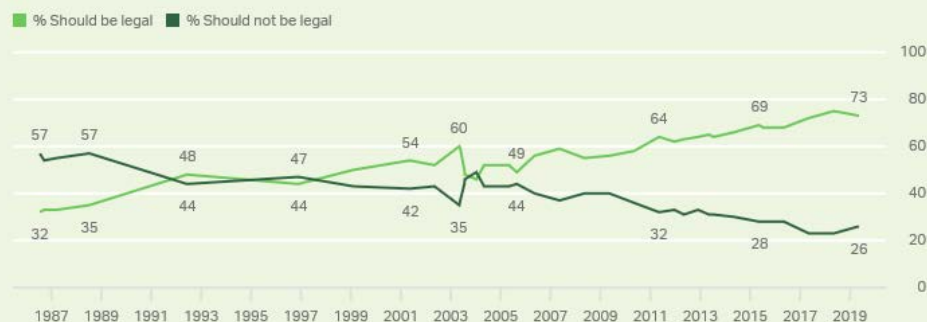
Evolution of Americans' Views on Gallup's Oldest Questions About Gay People

1977 2019



Do you think gay or lesbian relations between consenting adults should or should not be legal?

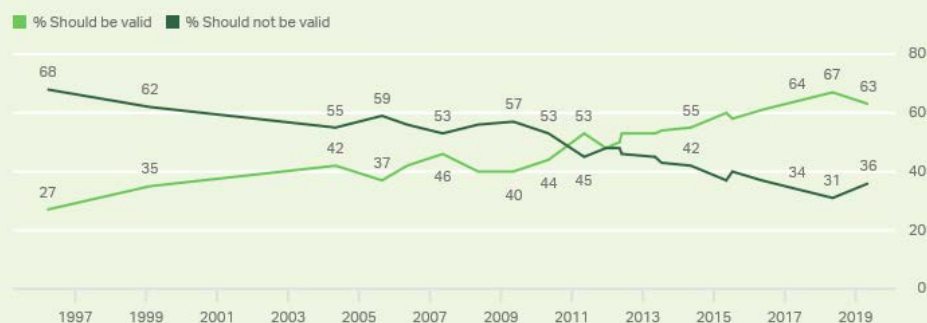
Selected Trend



1986-2008 wording: Do you think homosexual relations between consenting adults should or should not be legal?

GALLUP

Do you think marriages between same-sex couples should or should not be recognized by the law as valid, with the same rights as traditional marriages?



Trend for polls in which same-sex marriage question followed questions on gay/lesbian rights and relations.

GALLUP



For Your Consideration – Ones to Watch Volume II

JIM KELLER

With most of the major film festivals behind us following the New York Film Festival (NYFF) (September 27-October 13, 2019), it's time for the second of the three-part "Ones to Watch" series, which examines the contenders of the Best Actress Oscar race. At this juncture, most of the films have been screened, making it easier to identify the true contenders—but it is still early, and a lot can change.

Unlike [Best Actor](#), Best Actress is not often tied to Best Picture. However, the films of the Telluride and Venice film festivals along with the Toronto International Film Festival (TIFF) and NYFF still act as a springboard for the performances, which, along with critical reception, form the Best Actress Oscar race. Before we get into this year's contenders, let's review last year's race.

By this time last year, all chess pieces were on the table with the five eventual Best Actress nominees coming from film festival premieres: Glenn Close (who has never won an Oscar) had become the frontrunner for *The Wife* following the film's bow at TIFF in 2017, Venice gave us Olivia Colman (*The Favourite*), Lady Gaga (*A Star Is Born*), and Yalitza Aparicio (*Roma*), and Telluride added Melissa McCarthy (*Can You Ever Forgive Me?*) to the mix.

Though Gaga had the wind at her back early on with critical reception for her singer/songwriter Allie, once the Broadcast Film Critics Association (BFCA) awarded both her and Close its Best Actress statuette, there was trouble in the air. Sure enough, the Golden Globe, given out by the Hollywood Foreign Press Association (HFPA), for Best Performance by an Actress in a Motion Picture - Drama went to Close (and her trademark simmer to a boil). But Colman's *enfant terrible* queen wouldn't be held down, and she matched Close, winning both the Globe for Best Performance by an Actress in a Motion Picture - Musical or Comedy and Best Actress in a Comedy from the BFCA. This set the stage for a nail-biting awards season finale that saw Colman as the victor. It would be remiss of me not to say that many feel Colman's performance, while outstanding, was really a supporting role.

All performances were discussed here with the exception of Aparicio who was swept along with success of Best Picture contender *Roma*. As for the others, Viola Davis couldn't find footing to get recognition for her much deserving work in *Widows*, nor could Nicole Kidman, who gave my favorite performance of the year in *Destroyer* (this oversight likely



Charlize Theron in "Bombshell (director: Jay Roach, studio: Lionsgate)"

Photo Courtesy of LIONSGATE

due to the film's late release date). Meanwhile, perennial favorite Saoirse Ronan's film *Mary Queen of Scots* was met with a lot of criticism and KiKi Layne's Tish missed the mark in *If Beale Street Could Talk*.

THE LEGEND: Renée Zellweger – Judy (director: Rupert Goold, studio: Roadside Attractions)

FYC: This drama follows the stage career of Judy Garland during 1968, the last year of her life, when she relocated to Great Britain for a string of sell-out concerts at the Talk of the Town. Zellweger was nominated for Best Actress in 2002 for *Bridget Jones's Diary* and again the following year for *Chicago*. She won the Oscar for Best Supporting Actress in 2004 for *Cold Mountain*, completing a three-year nomination streak. In 2010, she started what would become a six-year hiatus from acting, and in 2016, she began making her way back with roles in films such as *The Whole Truth*, *Bridget Jones's Baby*, and *Same Kind of Different as Me*. When she took the cover of *Elle* for the magazine's 21st-Annual Women in Hollywood Awards issue in October 2014, there was a lot of conversation in the media on whether she had undertaken substantial cosmetic surgery because of her new likeness. This is all to say that if anyone has lived the life in the limelight the way Garland's then fading star had, it is Zellweger, as shown in her magnanimous performance. When the film premiered at the Telluride Film Festival in August, Zellweger

became the frontrunner, and three months later, she retains the position.

Metacritic Score: 66

THE SHAPESHIFTER: Charlize Theron – *Bombshell* (director: Jay Roach, studio: Lionsgate)

FYC: A group of women decide to take on Fox News head Roger Ailes for sexual harassment and the toxic masculinity he presided over in this drama based on the real-life expose. It's hard to believe that in the nine years of FYC, Theron has not been featured. She won Best Actress in 2004 for *Monster* and was last nominated in 2006 for *North Country*. Since then, she has delivered several brilliant performances, including this year's *Tully*, which earned her a Golden Globe nomination for Best Performance by an Actress in a Motion Picture - Musical or Comedy and a Best Actress in a Comedy nomination from the BFCA. The iconic Imperator Furiosa in *Mad Max: Fury Road*, woefully ignored awards-wise, did net Theron a win for Best Actress in an Action Movie and a Best Actress nomination from the BFCA in 2015. Incidentally, this same phenomenon seems to have played out in 2017 for Amy Adams in *Arrival*, where both films earned several nominations, including Best Picture but shut out the film's star, shameful. *Bombshell* has been screened for critics and the reviews have been positive.

CONTINUED TO P. 13

What's more, the film's trailer depicts Theron's striking transformation into real-life journalist Megyn Kelly. At the time of this publication, the film has not yet premiered, but Theron looks strong for a nomination. But given its late release date, and a shortened awards season, Lionsgate will need to get screeners of the film to awards bodies who vote early to keep her name in the conversation.

Metacritic Score: 68

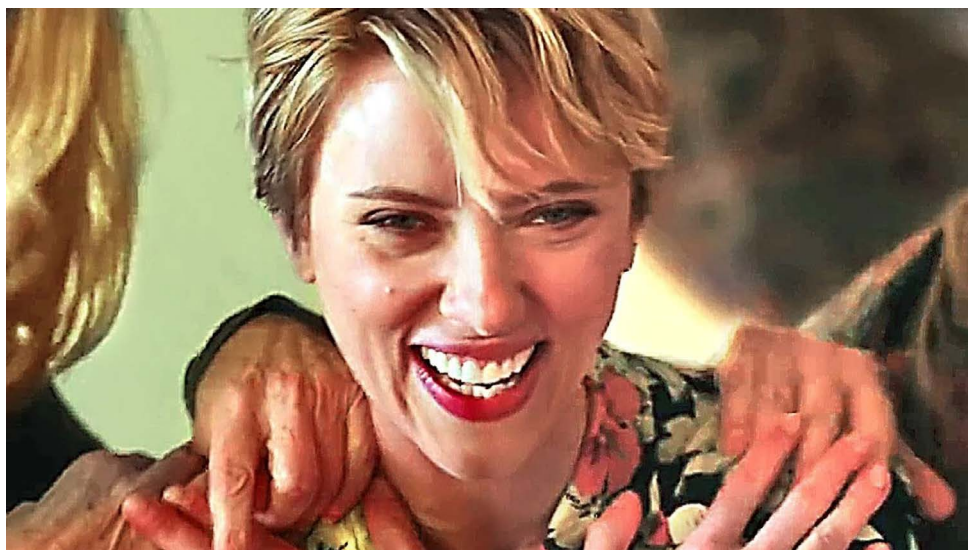
THE ACTRESS: Scarlett Johansson – *Marriage Story* (director: Noah Baumbach, studio: Netflix)

FYC: This comedy-drama gives a compassionate look at the breakup of a marriage between an actress (Johansson) and a stage director (Adam Driver) whose divorce spans both coasts and pushes them to extremes. Although today's audience knows Johansson for her high profile role as Marvel's Black Widow, Johansson was previously nominated for two Golden Globes in 2004 for *Lost in Translation* (Best Performance by an Actress in a Motion Picture - Comedy or Musical), which also netted her a British Academy of Film and Television Arts (BAFTA) award for Best Performance by an Actress in a Leading Role and a Best Supporting Actress BFA nomination, and *Girl with a Pearl Earring* (Best Performance by an Actress in a Motion Picture – Drama) for which she also earned a BAFTA nomination and the Best Actress award from the Los Angeles Film Critics Association (LAFCA). Her Golden Globe nomination streak continued in 2005 with a second nom in the latter category for *A Love Song for Bobby Long* and in 2006 for Best Performance by an Actress in a Supporting Role in a Motion Picture in *Match Point*. She also earned a BFA Best Supporting Actress nomination for *Her* in 2014. Johansson also appears in a supporting role in *Jojo Rabbit*, my favorite film so far this year, which could make her a double nominee. Having seen the film at NYFF, I can tell you her performance is certainly worthy of an Oscar nomination, but a win is not likely.

Metacritic Score: 94

THE WRITER: Saoirse Ronan – *Little Women* (director: Greta Gerwig, studio: Columbia Pictures)

FYC: Gerwig's rendition of this coming-of-age story concerning the lives of the March sisters in 1860s New England, after the Civil War, is the eighth film adaptation of the 1868 novel of the same name by Louisa May Alcott and stars Ronan as Jo March. I have detailed Ronan's



Scarlett Johansson in "*Marriage Story* (director: Noah Baumbach, studio: Netflix)"

Photo Courtesy of NETFLIX



Saoirse Ronan in "*Little Women* (director: Greta Gerwig, studio: Columbia Pictures)"

Photo Courtesy of COLUMBIA PICTURES

three Oscar nominations beginning with a Best Supporting Actress Oscar nomination for 2007's *Atonement*, spanning ten years to last year when she was nominated for Best Actress for *Lady Bird*. Unfortunately, Ronan joins Amy Adams and Jessica Chastain as actresses who have yet to be awarded by the Academy of Motion Picture Arts and Sciences (AMPAS) for their work. The film has screened for critics with positive reviews for both the film and Ronan, but whether her performance is enough to give her the edge over Zellweger remains to be seen—at least until the film is released on Christmas day and the embargo is lifted. Like Lionsgate for *Bombshell*, Columbia will need to be swift with its screeners.

Metacritic Score: 91

Up until now, you may have noticed that the best actress slate is comprised of all Caucasian blondes. I purposely organized this

piece to illustrate a shameful point when it comes to Oscar prognostication this year: as of today (November 14, 2019) most pundits have all picked the same four actresses described above, with the fifth slot being filled by a woman of color. Fifteen of them have Awkwafina for *The Farewell*, 6 have Lupita Nyong'o for *Us*, 7 have Alfre Woodard for *Clemency*, and 8 have Cynthia Erivo for *Harriet*. Only 8 out of 29 pundits have more than one woman of color picked for a nomination, and 2 pundits with outdated predictions are picking less likely contenders. But the reason most pundits are picking only one woman of color is because since 2014 AMPAS' response to #OscarsSoWhite has been to nominate at most one woman of color in a given year—hardly leveling the playing field. The thing is, pundits tend to play by the Academy's guidelines, thinking "What

will *they* do?”. And so continues this vicious cycle. With that said, let’s look at the rest of the field.

THE LIAR: Awkwafina – *The Farewell* (director: Lulu Wang, studio: A24)

FYC: In this comedy-drama, based in part on Wang’s life experiences, Billi (Awkwafina) is caught between a rock and a hard place when her Chinese family discovers their grandmother is terminally ill and keeps her prognosis a secret. During a family gathering, does Billi honor her family’s wishes or break the news to her grandmother? Awkwafina is perhaps best known as the spunky sidekick to Constance Wu’s Rachel in last year’s *Crazy Rich Asians*, but you may not know that the Queens native is also a rapper. So far this season, Awkwafina has been nominated by the Gotham Awards for Best Actress for her work in this Sundance Film Festival Grand Jury Prize dramatic nominee. But the award does not usually factor into an Oscar—could a shorter Oscar season be more of a harbinger of what’s to come?

Metacritic Score: 89

THE SINGER: Cynthia Erivo – *Harriet* (director: Kasi Lemmons, studio: Focus Features)

FYC: This biographical film finally puts one of America’s greatest heroes in the limelight as it tells the tale of escaped slave-turned-abolitionist, Harriet Tubman, who freed hundreds of enslaved people and helped change history as a conductor on the Underground Railroad. Erivo, also a stage actress, won the Tony Award for Best Actress in a Musical in 2016 for her role as Celie in *The Color Purple*. In 2017, she won both a Grammy for Best Musical Theater Album and a Daytime Emmy for Outstanding Musical Performance in a Daytime Program (also for her work in *The Color Purple*), putting her in line for an **EGOT**. Lemmons’ film, which premiered at TIFF, eschews comparisons to other recent films depicting enslaved people through her vision of a more light-hearted approach to the subject matter. The result is a bit formulaic for the taste of critics. Still, Erivo is fierce and compassionate as Tubman, who followed her heart and the North Star to bring enslaved people to the north from 1850-1861. However, as a British actress, Erivo has faced a lot of backlash from many who believe the role should have gone to an American. These remain sticking points as Erivo reaches for gold this year.

Metacritic Score: 66



Awkwafina in "*The Farewell* (director: Lulu Wang, studio: A24)"

Photo Courtesy of A24



Cynthia Erivo in "*Harriet* (director: Kasi Lemmons, studio: Focus Features)"

Photo Courtesy of FOCUS FEATURES

THE WARDEN: Alfre Woodard – *Clemency* (director: Chinonye Chukwu, studio: Neon)

FYC: This drama follows prison warden Bernadine Williams (Woodard) whose job has taken a psychological toll as she confronts her demons, thereby connected to the latest man she is sanctioned to execute. Woodard was nominated for Best Supporting Actress way back in 1984 for *Cross Creek*. In 1993, she was then nominated for the Golden Globe for Best Performance by an Actress in a Supporting Role in a Motion Picture for *Passion Fish* (Best Performance by an Actress in a Supporting Role in a Motion Picture). Afterwards, her awards recognition was relegated to television. She picked up the Globe for Best Performance by an Actress in a Miniseries or Motion Picture Made for Television in 1998 for *Miss Evers' Boys* and was last nominated by the HFPA in 2001 for Best Performance by an Actress in a Miniseries or Motion Picture Made for Television for *Holiday Heart*. Woodard’s television bona fides go well beyond the Globes, with twelve Primetime Emmy nominations and four wins. There is no question that Woodard is adored by Hollywood, and her perfor-

mance is astounding in the Sundance Grand Jury Prize (dramatic) winner, but the film is small and not set to be released until December 27. This is another film where the actress’s awards chances could be heavily influenced by whether its studio (Neon) distributes screeners in time.

Metacritic Score: 76

Other actresses vying for the Best Actress Oscar include the aforementioned Nyong’o, whose film is a horror and therefore an uphill climb (Toni Collette received raves for her performance in *Hereditary* this year but was ignored by AMPAS), leading me to believe this performance, though amazing, will be left out. There is also newcomer Jodie Turner-Smith who has been turning heads in the *Bonnie & Clyde*-esque *Queen & Slim*, Kristen Stewart in *Seberg*, Helen Mirren in *The Good Liar*, and Felicity Jones in *The Aeronauts*.

When next you hear from me, it will be in February and the Academy Awards will be a little over a week away! I’ll do a quick analysis of the supporting players and end the season with my picks in all major categories. Until

Culture Corner: An Interview with 2001: A Space Odyssey Star Keir Dullea

BERNIE LANGS

Keir Dullea is a stage and film actor best known for his leading role in Stanley Kubrick's 1968 masterpiece and genre-changing movie, *2001: A Space Odyssey*. During an hour-long phone interview from his home in Westport, Connecticut, Mr. Dullea's voice and his sharp recall of his career did not convey any sense of him slowing down at 83 years old. I could easily recognize the same vitality that his 2001 character, astronaut David Bauman, displayed as he powers down his spacecraft's infamous computer, HAL, goes rogue. Mr. Dullea is still performing on the stage and he briefly discussed some of his upcoming films. What follows is an edited version of our discussion.



Keir Dullea as astronaut David Bauman in *2001: A Space Odyssey* (1968)

Photo Courtesy of MGM | GETTY

Keir Dullea on why he enjoys the stage:

I had the theater before I ever did my first film. I would say a lot I had done in those days, they don't really do this anymore, summer stock at the summer theaters around the country, as resident companies where you would have a group of actors that would do every play for ten weeks, ten plays in ten weeks and you didn't even have a full week's rehearsal. I had done my first season in 1957. For four years in the summers I had done probably fifty plays, always an exciting challenge.

The big part of what makes theater for me more exciting than film: it's working with a live audience. There's this spirit that makes every performance slightly different because if it's a five-character play, there's a sixth character and that's the character of the audience. And if it's a serious play, it makes a difference every night.

I've done about thirty-five films, but I've probably done about sixty or seventy plays in my life. I'm pleased with some of the films I've done [such as] *2001* and *David and Lisa*, but also my first film, which didn't do a lot for my career, but it got great reviews. *David and Lisa* is one I'm very proud of. That was my second film and kind of was responsible for my film career.

My first hit on Broadway was *Butterflies are Free* with Blythe Danner. It was her first Broadway play. The peak Broadway experience for me was the first revival of *Cat on a Hot Tin Roof* with Elizabeth Ashley. She's done some important films, but her Broadway credits are enormous. She's a brilliant actress. She was nominated for a Tony and

she should have won it. Tennessee Williams said, because he was around while we were rehearsing, she was exactly the character he had in mind when he wrote the play.

Working on [the film] *Bunny Lake is Missing* was not a pleasant experience because of the director; Otto Preminger's reputation among actors was pretty bad. He humiliated his cast and screamed at the top of his lungs. [Co-star] Laurence Olivier was very conscious of it, but he didn't treat Olivier that way. Olivier was very conscious of the pressure that I was under. I would [mess] up my lines. It wasn't because I had a lot of lines. Being a stage actor, I'm used to memorizing a lot of lines. The stress of working with that man was such that I would often go off in my lines. Olivier would run lines with me; we'd off away from the set for hours at a time. He was so kind. He was wonderful. I loved working with him.

On working on *The Good Shepherd* directed by Robert DeNiro:

...DeNiro, we both grew up in the same part of Manhattan in Greenwich Village. We had met sometime briefly [years before the film]. My role wasn't that demanding. I loved the opportunity to be working with Angelina Jolie. She was lovely. She wasn't like, 'I'm the star.' She was very natural and easy to work with. As was William Hurt. And DeNiro was lovely to work with. I loved just meeting Matt Damon. I have great admiration for him as an actor.

On getting chosen for the lead and working with director Stanley Kubrick on *2001*:

One day after work on *Bunny Lake is Missing* I came back in the evening after a day of shooting. And my wife said, your agent called, so I called my agent and he said, "Are you sitting down?" I said, "No, why?" "You better sit down, you've just been offered the lead in Stanley Kubrick's next film." Out of the blue. I had no idea I was being considered. I don't know all the films he looked at, but I know he'd probably look at *David and Lisa*. Although if you've seen that, it wouldn't clue you into it, but Stanley saw me for the character that he wanted.

It was a dream experience. I can't say it's the role of my dreams. But I am an important link of many links in one of the greatest films ever made. It all has to do with Stanley Kubrick. He was a genius. The funny thing is the film didn't start off being successful. It took a couple of months for MGM to stop being worried because there were three major premiers—Washington, New York, and Los Angeles—and people walked out of all of them. Some of the reviews were brilliant, but a lot of them by well-known critics really slammed the film. And then suddenly, there were lines around the block a couple of months later and the makeup of those lines was the younger generation. I think they came out with a new poster because they figured that a lot of these young people were smoking "funny cigarettes." It said "*2001: A Space Odyssey*, the Ultimate Trip."

Arthur C. Clark...we met, we had discussions, and I sort of got to know him. I wasn't a big science fiction fan by the time I made *2001*, but I was as a teenager. My

CONTINUED TO P. 16

mother would give me every year in those days a book that was the best science fiction of 1950 or whatever. I remembered reading the [2001] script before I arrived in London to begin filming. And I'm thinking it was vaguely familiar. And then it hit me. I had read a short story by Arthur C. Clark called *The Sentinel*. That was the germ, that was the short story that Kubrick read. To be in the presence of [Kubrick] and the contrast between Otto Preminger and this man was just enormous. Never raised his voice, was always quiet, was open to discussion. You could suggest things.

During the final scenes of the film, we watch Dave Bauman aging and watching himself age. The culmination is a shot of him eating alone, breaking a wine glass, and suddenly stopping to see his final, eldest self in bed breathing his last as the Monolith appears towering over him. On how Dullea influenced that stunning moment:

It's not one of *the* major elements of the film, but yeah, I think it's a major element in the film. I think it's immense. Kubrick was always open to [ideas]. He was going to use it, but, then I explained why, the reason I wanted to do it. It was not for some esoteric reason. If you remember the first view of me in that room, I'm still in my space suit yet looking out, I'm still in the pod. And then the next version—I'm still standing in the room, and then there's another version [of me] where, I look out of the visor of the space suit and see that my spacesuit is gone. And then that version walks into the bathroom and there then is me. Each, a younger version—and what does he see? He sees the older version. You never cut back to the first version. And so he looks and he sees the older version sitting at the table eating. In the scene where I knocked the glass over, I said, let me have a slightly different way of reacting to hearing something. Let me knock the glass over and in mid-gesture, reaching over to get the glass, I'm aware of something. And what I am aware of is the oldest version [of me] on the bed. I wanted a slightly different way of reacting. I didn't want to just hear something, I wanted a gesture that somehow that was different. The brilliance shines in every scene, but particularly in that scene. That oldest version, thank God, we didn't have to do that more than one or two takes. It was all done within one day. The makeup for that version took twelve hours.

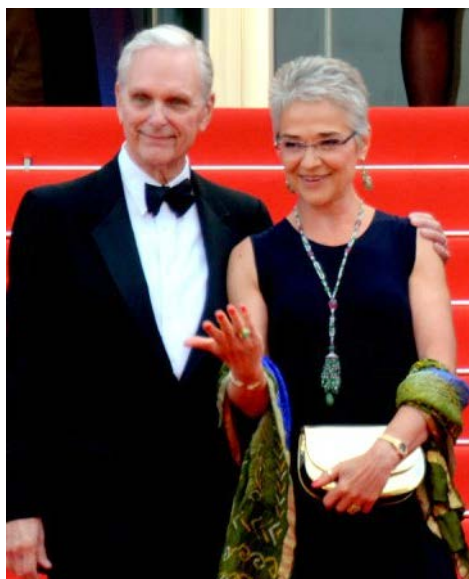


Photo Adapted from GEORGES BAIRD

Keir Dullea with Katharina Kubrick, daughter of Stanley Kubrick, at showing of 2001 at the Cannes Film Festival in 2018

On some of Dullea's favorite moments in 2001:

One of my favorite sequences when I first saw the film was, 'The Dawn of Man.' Dan Richter who played the leading ape was a mime. He was brilliant. The 'jump cut' in the film, from the bone to the space station, that's the greatest jump cut in the history of film. And my other favorite moment in the 'Dawn of Man' is when Dan Richter is fiddling around with some bare bones, just kind of arbitrary, and he's hitting one bone, hitting the other bone and suddenly a piece flies up in a certain way. He pauses for a minute and is curious, suddenly tilts his head. And it's the moment when the penny drops. He gets it. It's brilliant.

It's amazing that how Stanley got so many things completely right. He absolutely had [predicted] Skyping, he had [predicted] iPads. He contacted something like forty different corporations and asked them to send their best guess as to what their product might be [like] many years later in 2001.

Dullea's line in 2001, "Open the pod bay doors please, HAL," is #78 on the American Film Institute's list of the top 100 movie quotes. He noted that since Stanley Kubrick couldn't decide on a voice for HAL, during filming an assistant with a strong British accent would feed the stand-in lines for HAL's voice. On the iconic scene where he turns off the computer and about a speech of his that was later cut from the film:

We had weeks of discussion before we began filming, [and Kubrick] had Gary Lockwood who played the other astronaut and myself there for all kinds of reasons, costume fittings, and makeup tests. But one of the things we talked about was who these characters were, how he imagined they might be chosen in the year 2001 [for the mission]. He said that it's not mentioned in the film, but I think you both probably have double doctorates in some scientific disciplines of some sort. And more important than that is your psychological profile. One of the reasons there is the least dialogue of the whole film [in our part] other than 'The Dawn of Man,' is that the other astronaut and I are the only two astronauts awake. And it's been months this journey from the Earth to Jupiter, imagined by Stanley, would take months. So by the time we pick up on their trip, they're talked out, there's nothing left to talk about. They have their daily routines, which you don't have to talk about.

In terms of an emotional scene, the closest I had was when I'm taking HAL apart. And for me, you try to find it as an act when you're playing a role. In order to play it successfully, it doesn't mean you have to have gone through those experiences exactly the way it is in the script yourself. You'll have to find parallels. The closest parallel in your own life or even if it's a book you've read, some emotional response that you had and you bring that to those moments. And the closest that worked for me is [the film of] John Steinbeck's book, *Of Mice and Men*. He [Lenny] doesn't shoot him [George] with anger. He shoots him because he cares about him. Don't forget HAL is a member of the crew.

I had this dialogue, which was the longest piece of dialogue in the whole film. It was very hard to memorize because from my point of view, it was technological gobbledygook. I worked on it for weeks. And, Kubrick ultimately when he was editing the film, cut the scene, deciding it was redundant. But because of the way I had to memorize that, like memorizing phonetically a foreign language that you don't speak, I can still do the speech. Exactly. And it went like this: 'Mission control is there's extra an elder one at one nine or two zero on board vault prediction center in a nightmare. The zero computers showed up, the echo three, five units as possible. So you within 48 hours request check your in shift system simulator. Also confirm your approval. Our plan to go Eva replace out the echo three, five unit five and failure. Mission control this is X, a Delta one transmission concluded.' (It'll go to my grave!) ■

Freestyle Love Supreme

MELISSA JARMEL

Freestyle Love Supreme (-preme, -preme, -preme, -preme, as they say in the [show](#)) is the most joyful performance on Broadway right now. This show features the hip-hop improv troupe dubbed Freestyle Love Supreme founded by director Thomas Kail and performer Anthony Veneziale in 2003 with future Tony-award nominated and winning cast members such as Lin-Manuel Miranda, Christopher Jackson, and James Monroe Iglehart. By the nature of improv, every show is a show unto itself.

With their mastery of the English language and the rhythm of beatboxing, this group follows a set structure of improv songs that comprise an eighty-minute show without an intermission. But the words, themes, and circumstances of the songs are determined by the audience. Audience participation can range from contributing written words before taking your seat that will be incorporated into the show to volunteering to tell a story of an embarrassing situation that you desperately wish you could do over. These contributions can lead to memorable stories such as when Lin-Manuel Miranda used my word “chromosome” to rap about the theater being a place of gender inclusion, or a riff off of the embarrassing story of a girl punching a boy in the face for saying Santa wasn’t real.

In addition to the ever-changing audience input (except for the nightly yells of “Trump” after the group solicits the audience for things they dislike at the moment), the performers change nearly every night. Freestyle Love Supreme is made up of seven core members:

- Utkarsh Ambudkar a.k.a. UTK in INC (you might recognize him from Pitch Perfect)
- Andrew Bancroft a.k.a. Jelly Donut (self-described Justin Timberlake knockoff)
- Aneesa Folds a.k.a. Young Nees (who came up through the [Freestyle Love Supreme Academy](#))
- Arthur Lewis a.k.a. Arthur the Geniuses (the master of the keys)
- Kaila Mullady a.k.a. Kaiser Rözé (the 2015 and 2018 World Beatbox Champion)
- Chris Sullivan a.k.a. Shockwave (the original beatboxer from Freestyle

Love Supreme’s 2003 days)

- Anthony Veneziale a.k.a. Two Touch (the founding member and frequent master of ceremonies of the show).

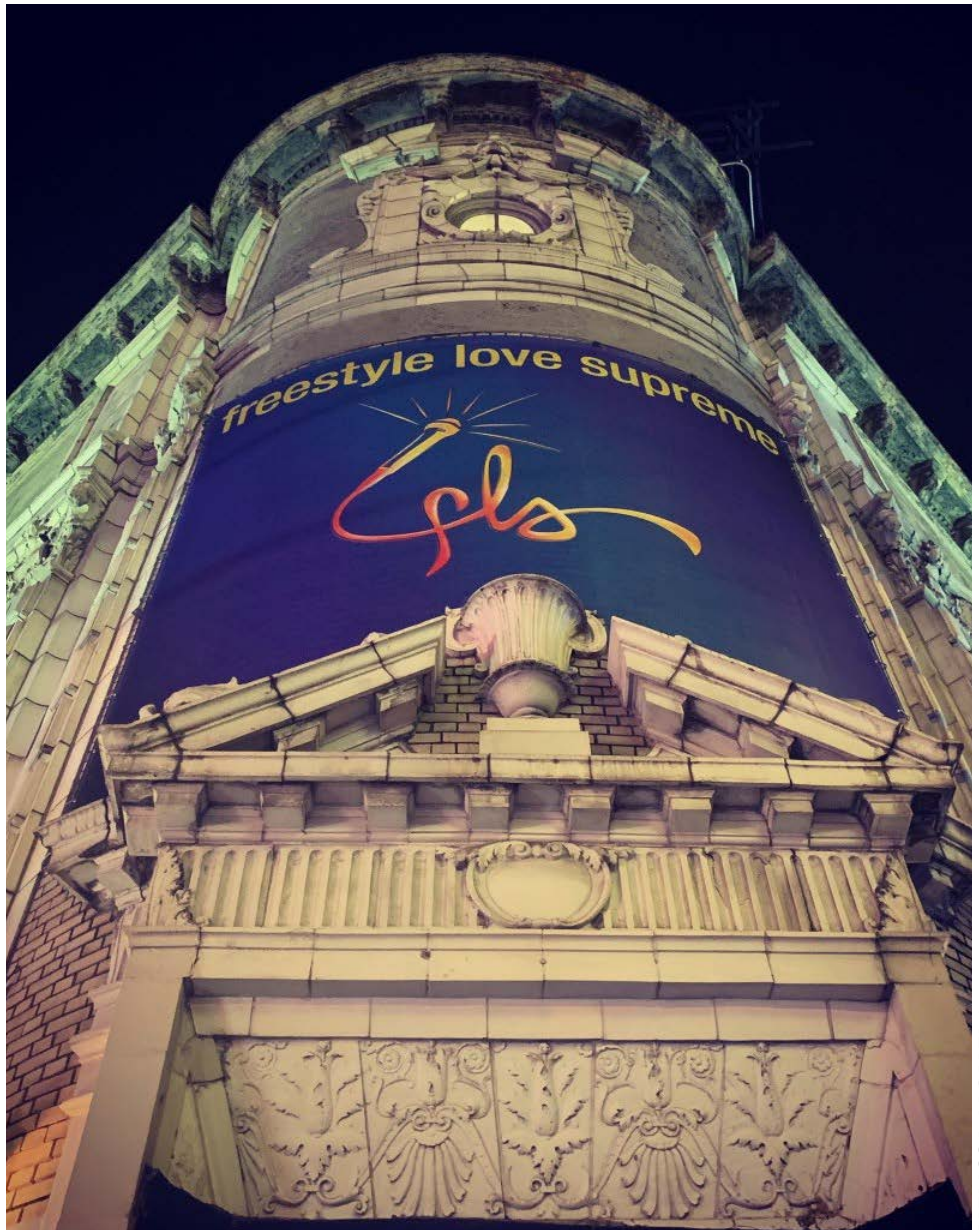
There are also regular cameo performers: Wayne Brady, Daveed Diggs, Ashley Pérez Flanagan, James Monroe Iglehart, Christopher Jackson, Lin-Manuel Miranda, and Bill Sherman. Surprise guests, such as the spoken word poet Sarah Kay and legendary actors Helen Mirren and Ian McKellen, have also crashed the show. You never know which four or five performers will be part of the show that night until you arrive.

While some audience input is more entertaining and memorable than others, Freestyle Love Supreme never fails to dazzle the audience with clever lyrics that fill the Booth Theatre with roaring laughter. The upbeat energy of Freestyle Love

Supreme’s relentless creative imaginings brought me back to see the show time and time again. However, its run on Broadway is a limited engagement, set to close January 12, 2020. They have 10 p.m. shows on the weekends that tend to be a little less kid-friendly, a lot more risqué, and always hilarious. Also be ready to semi-part from your phone for the duration of the show: all phones and smartwatches are locked in Yondr pouches that you get to keep in your possession, so the bliss of a phone-free show can truly happen. ■

Discount tickets have appeared on TDF and at TKTS booths. Tickets are also frequently resold on Stubhub. You can also get tickets through the digital [lottery](#).

Booth Theatre 222 W. 45th St



MELISSA JARMEL | NATURAL SELECTIONS

Pets of Tri-I

POOJA VISWANATHAN



For this issue, I interview **Sumo**, the dog who lives with **Margaret Fabiszak (Freiwald Lab, The Rockefeller University)** and her husband, **James**.

Pooja Viswanathan: How old are you?

S: Roughly in my 60s. We don't know exactly! If anyone at the Tri-I can give me an estimate based on my DNA methylation, let me know. I lick everything and shed constantly. It's very easy to get my DNA.

PV: Is there a story behind your name?

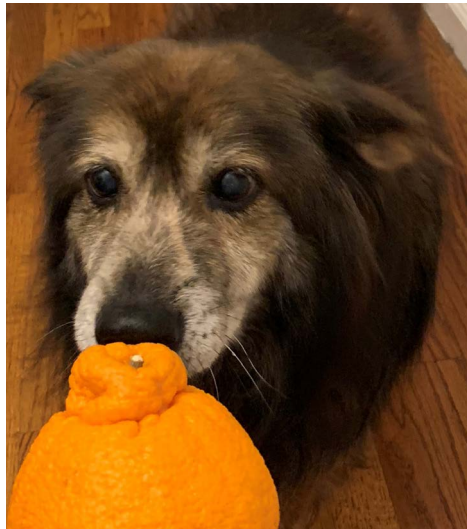
S: I'm told I have a reddish-orange coat (although if you ask me, I'd say brownish-brown) so my humans had the idea of naming me after an orange fruit in what is apparently a long held tradition of naming pets based on their color scheme. I'm skeptical at the novelty, but I'll still go with it. The first contender for a name was Kumquat, but that ran the risk of being confused with a word I'd later become acquainted with, "Come." Let's all agree that the resulting name Quat isn't particularly flattering. After a bit more thought, Sumo Citrus stuck! You can all call me Sumo.

PV: How did you first meet your humans?

S: They came to meet me in a great shelter called Animal Lighthouse Rescue. We went for a walk in Central Park and I knew I had them hooked.

PV: What is your first memory?

S: I grew up in Puerto Rico and was a stray most of my life. Given the lengths to which I'll go for them now, I have to imagine that



chicken bones had a strong impression on me as a pup. A big chicken bone on a long, warm day—that's my ideal picture of my youth.

PV: Where do you live?

S: Harlem with my humans.

PV: What are your favorite smells of NYC?

S: Chicken bones are high up there, but they're a rare find on a walk here. I smell A LOT of urine in this city and I appear to love it. My humans support my interests though. They're even working on making an app called PupPee Value to reveal a social network of neighborhood dogs!

PV: What are your favorite neighborhoods in NYC?

S: Harlem, Jamaica, and Park Slope—anywhere I know humans who will give me lots of treats.

PV: If you could live anywhere else in the world, where would you live?

S: A place with chicken bones, beds I'm always allowed on, and humans who know exactly how I like my belly rubbed.



PV: What are your favorite foods?

S: Chicken bones! But since I'm not allowed chicken bones, I'll settle for any treat with meat in it. If it's human-grade beef jerky, I'll often run through all the tricks I know on repeat until my humans stop laughing and give me the jerky.

PV: What is your favorite weekend activity in NYC?

S: Going for a hike followed by a long nap in the sun coming through the windows ...and then eating.

PV: Besides your human roomie, who is your favorite human in the Tri-I community?

S: Most any treat giver! Lots of Tri-I humans have even looked after me for a weekend! I haven't found one yet who will give me chicken bones. They will be my favorite.

PV: Do you have a funny story to share with us?

S: NYC is a wild and magical city. I love chasing squirrels and even get to chase a few rats! One time I thought I was chasing a squirrel but it turned into the tail of our neighborhood cat. I was so surprised at this transfiguration I jumped into a somersault and ran to my humans! I'm still not sure why they found this so funny, but they laughed for a long time and gave me extra head scratches. The cat was unfazed.

PV: Is there some way we can see more pictures of you on the interwebs?

S: Unfortunately, I don't have thumbs so I can't make an Instagram yet, or for that matter, I can't even open the door to the closet with treats!

PV: If you could have any human ability, what would it be?

S: Thumbs. ■

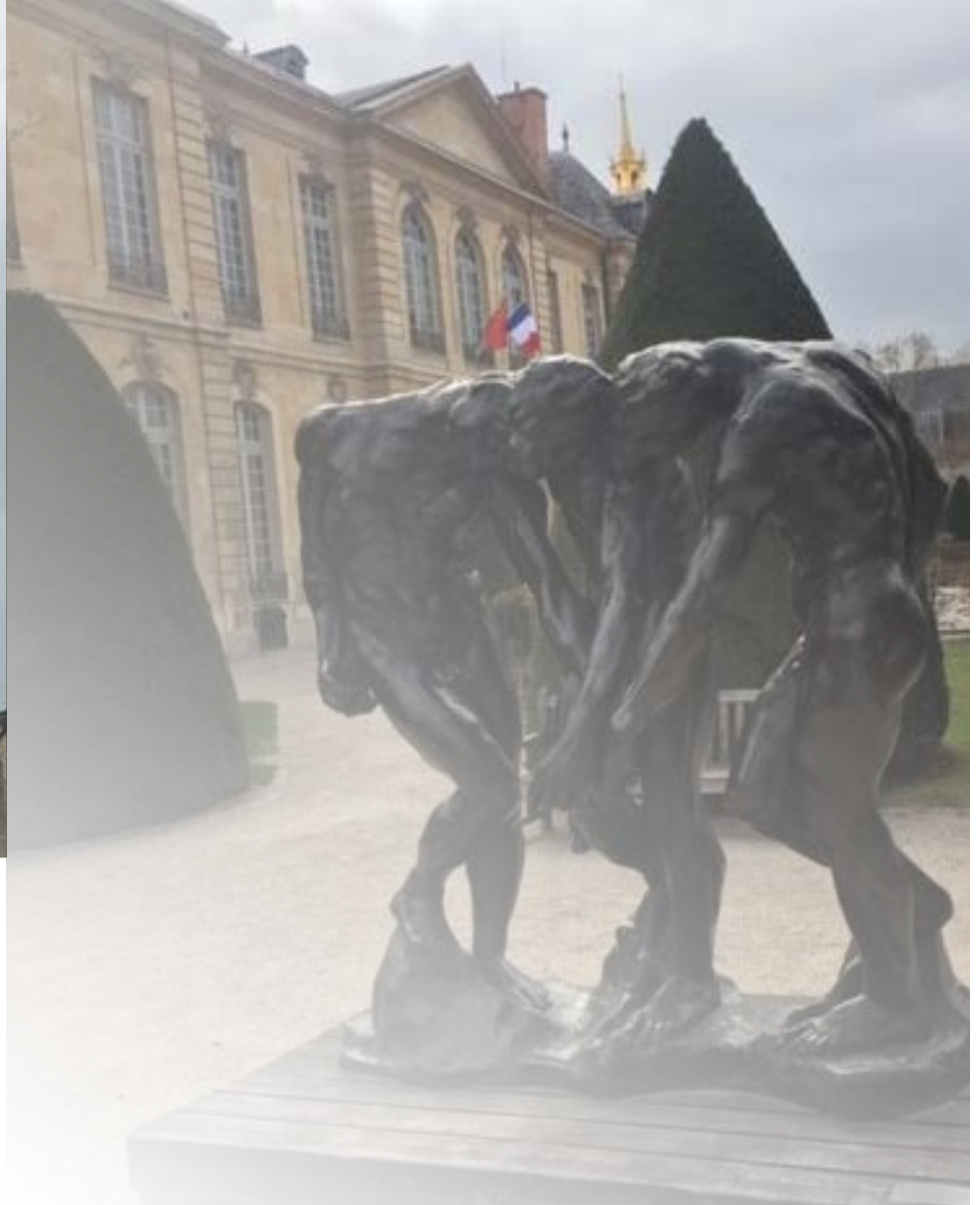


Life on a Roll ***Musée Rodin***

BERNIE LANGS



The Musée Rodin in Paris was founded in 1919 as a showcase for the works of the French sculptor Auguste Rodin (1840-1917). It is housed in the Hôtel Biron, which was used by Rodin as his workshop. He later donated his entire collection of sculptures, along with paintings by Vincent van Gogh, Claude Monet, and Pierre-Auguste Renoir to the French State. The sculptures “The Thinker” and “The Three Shades” are located in the beautiful gardens of the museum. ■





Life on a Roll **INSIDE IRAN:** **SAND DUNES OF VARZANEH**

NAN PANG

Between Isfahan and Yazd, I decided to take a detour at the Varzaneh Desert. After a minivan ride and hitchhiking, the majestic sand dunes of Varzaneh suddenly appeared in front of me. According to Hamidreza, our beloved local guide, the average height of those dunes is the highest in the Iranian deserts.

The magic began at the dusk, as the sky started to paint the desert. Five minutes before sunrise was probably the most silent time of day. Yet still, I thought I heard Scheherazade finishing her tale, travelling on the wind across the dunes. ■

