

April 27, 2015

The first three items today deal with yet more failures of government. [Slate](#) starts us off with a overview of a devastating WaPo article on how, for decades, the FBI evidence gnomes falsified evidence in service to prosecutors.

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*What went wrong? The Post continues: "Of 28 examiners with the FBI Laboratory's microscopic hair comparison unit, 26 overstated forensic matches in ways that favored prosecutors in more than 95 percent of the 268 trials reviewed so far." The shameful, horrifying errors were uncovered in a massive, three-year review by the National Association of Criminal Defense Lawyers and the Innocence Project. Following revelations published in recent years, the two groups are helping the government with the country's largest ever post-conviction review of questioned forensic evidence.*

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Next [Megan McArdle](#) covers how the collection of past due support from dead beat dads has created catch-22 situations for many blacks; including Walter Scott who was gunned down by police in North Charleston, SC a few weeks ago. *In the 1980s and 1990s, the government found itself financially supporting a lot of single-parent families in which one parent was not contributing to the support of their children. Unsurprisingly, this led authorities to crack down on "deadbeat dads," with stiff penalties for parents who didn't pay the money they owed. And that kind of situation might have helped lead to Walter Scott's shooting death on April 4. Like many poor men, Scott owed back child support that had incurred severe penalties, including stints in jail, and his family argues that he probably fled from the police during a routine traffic stop because he feared another arrest. ...*

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*can actually make it harder for them to make their payments: Scott reportedly lost a \$35,000-a-year job because the state of South Carolina misdirected his checks, then jailed him for nonpayment. ...*

The NY Times reports on missing black men. Or course, being the Times, they could not come up with the thought that maybe the government has, through our welfare system, made fathers and husbands superfluous. Our country is filled with similar perverse incentives, and this is perhaps the most damaging to our culture.

*In New York, almost 120,000 black men between the ages of 25 and 54 are missing from everyday life. In Chicago, 45,000 are, and more than 30,000 are missing in Philadelphia. Across the South — from North Charleston, S.C., through Georgia, Alabama and Mississippi and up into Ferguson, Mo. — hundreds of thousands more are missing.*

*They are missing, largely because of early deaths or because they are behind bars. Remarkably, black women who are 25 to 54 and not in jail outnumber black men in that category by 1.5 million, according to an Upshot analysis. For every 100 black women in this age group living outside of jail, there are only 83 black men. Among whites, the equivalent number is 99, nearly parity.*

*African-American men have long been more likely to be locked up and more likely to die young, but the scale of the combined toll is nonetheless jarring. It is a measure of the deep disparities that continue to afflict black men — disparities being debated after a recent spate of killings by the police — and the gender gap is itself a further cause of social ills, leaving many communities without enough men to be fathers and husbands.*

*Perhaps the starkest description of the situation is this: More than one out of every six black men who today should be between 25 and 54 years old have disappeared from daily life. ...*

Space junk, a problem created by many governments, is a target of lasers in a proposal reported in Spectrum.

*The easiest (and probably best) way to deal with the space junk problem is to stop producing space junk in the first place. We're trying to do that, which is great. But even if space agencies and commercial launch companies all commit, tomorrow, to rockets and satellites that will deorbit themselves after no more than 25 years, there's still all kinds of debris flying around up there, threatening our orbital infrastructure.*

*Many ways of dealing with orbital debris have been proposed, and some are even being tried out. Researchers working at RIKEN, a research institution in Japan, are leading an international team that wants to put a laser cannon on the International Space Station to try to shoot down small pieces of junk on the fly.*

*One of the most difficult parts of dealing with space junk is finding it in the first place. To then shoot it with a laser at a distance of 100 kilometers or more, you have to be able to track it very precisely, which necessitates a very sensitive wide-angle optical telescope. Fortunately, the ISS is about to get one. EUSO, the Extreme Universe Space Observatory, will be installed on the*

ISS in 2017, and the researchers at RIKEN must have said to themselves, “hey, we could slap a laser on that thing and blast space junk.” So they’re going to give it a try. ...

**Science 2.0** has an idea for ending the summer break literacy slide.

*Those "Diary Of A Wimpy Kid" books are not "The Good Earth", they are not going to win Pulitzer Prizes, but they are a lot better for kids in the summer than staying glued to YouTube videos. And for most kids, that is going to be the choice. Rather than sending home a reading list (poor schools) or stacks of books (rich schools) in the hopes of combating the the literacy loss experienced during the summer break, a new study finds that letting kids choose the books is better.*

*The study, conducted in kindergarten, first-, and second-grade classrooms in the Rochester City School District, showed that students who were allowed to choose their own summer reading saw lower levels of literacy loss over the summer months. Erin T. Kelly, M.D., the study's lead researcher, will present her findings at the Pediatric Academic Societies meeting on April 25. ...*

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*For example, one of the saddest days analyzed was the day Michael Jackson died. Some of the happiest days were US elections. On average, Louisiana is the saddest state. Hawaii is the happiest. If you've got more Twitter followers, you're more likely to tweet happy things, and if you use the word "office" it's likely you're feeling down.*

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**Slate**

**[Pseudoscience in the Witness Box](#)**

***The FBI faked an entire field of forensic science.***

by Dahlia Lithwick

[The Washington Post published a story](#) so horrifying this weekend that it would stop your breath: “The Justice Department and FBI have formally acknowledged that nearly every examiner in an elite FBI forensic unit gave flawed testimony in almost all trials in which they offered evidence against criminal defendants over more than a two-decade period before 2000.”

What went wrong? The *Post* continues: “Of 28 examiners with the FBI Laboratory’s microscopic hair comparison unit, 26 overstated forensic matches in ways that favored prosecutors in more than 95 percent of the 268 trials reviewed so far.” The shameful, horrifying errors were uncovered in a massive, three-year review by the National Association of Criminal Defense Lawyers and the Innocence Project. Following revelations published in recent years, the two groups are helping the government with the country’s [largest ever post-conviction review of questioned forensic evidence](#).

Chillingly, as the *Post* continues, “the cases include those of 32 defendants sentenced to death.” Of these defendants, 14 have already been executed or died in prison.

The massive review raises questions about the veracity of not just expert hair testimony, but also the bite-mark and other forensic testimony offered as objective, scientific evidence to jurors who, not unreasonably, believed that scientists in white coats knew what they were talking about. As Peter Neufeld, co-founder of the Innocence Project, put it, “The FBI’s three-decade use of microscopic hair analysis to incriminate defendants was a complete disaster.”

This study was launched after the *Post* [reported that flawed forensic hair matches](#) might have led to possibly hundreds of wrongful convictions for rape, murder, and other violent crimes, dating back at least to the 1970s. In 90 percent of the cases reviewed so far, forensic examiners evidently made statements beyond the bounds of proper science. There were no scientifically accepted standards for forensic testing, yet FBI experts routinely and almost unvaryingly testified, according to the *Post*, “to the near-certainty of ‘matches’ of crime-scene hairs to defendants, backing their claims by citing incomplete or misleading statistics drawn from their case work.”

It was later revealed that one of the hairs presented at trial came from a dog.

NACDL executive director Norman Reimer said [in an interview with Associations Now](#) that the flaws in the system had been known for years now. “What we were finding was that the examiners ... wouldn’t just simply say that there was a microscopic similarity [between the two hairs], but they would go beyond that and say it was a 100 percent match, essentially misleading the jury into concluding that the evidence had a certain value that it didn’t actually have,” Reimer said.

This problem doesn’t stop with the FBI labs or federal prosecutions. The review focuses on the first few hundred cases, involving FBI examiners, but the same mistakes and faulty testimony were likely presented in any state prosecutions that [relied on the between 500 and 1,000 local or state examiners trained by the FBI](#). Some states will automatically conduct reviews. Others may not. Much of the evidence is now lost.

Systemic change, in other words, is being left to the discretion of the system itself.

Paradoxically, Justice Antonin Scalia has emerged as a vocal early [skeptic about the risk of taint in the work of crime labs](#), even though he contended in 2006 that, “It should be noted at the outset that the dissent does not discuss a single case—not one—in which it is clear that a person was executed for a crime he did not commit. If such an event had occurred in recent years, we would not have to hunt for it; the innocent’s name would be shouted from the rooftops by the abolition lobby.” It is clearer now than ever that crime labs and prosecutors’ officers *do* make mistakes, shameful, devastating mistakes, and that they don’t usually distinguish between capital and noncapital cases when they do so.

Sen. Patrick J. Leahy, D-Vermont, and Rep. Eddie Bernice Johnson, D-Texas, the ranking Democrats on the Senate Judiciary and House Science committees, respectively, are looking for forensic-science reforms to hold examiners to meaningful standards. But this hardly helps the folks who are in cells for crimes they didn't commit, based on evidence that—according to scientific experts—is all but worthless.

This whole justice-disaster-on-wheels is not a problem that has gone unreported. As [Conor Friedersdorf notes](#), state and national publications have been exposing the inadvertent errors and deliberate manipulations of forensic crime labs across the country for years now. We have covered these issues [at Slate](#). But as long as crime labs answer to prosecutors, and indeed, according to *Business Insider*, [in some cases they are compensated for each conviction](#), the incentives for reform are hopelessly upside-down. The problem, in short, isn't that we can't identify the problem.

There is no lack of good ideas for reform. (Journalist Radley Balko and Roger Koppl, a professor of finance at Syracuse University's Whitman School of Management and a fellow at Syracuse's Forensic and National Security Sciences Institute, [offered up a laundry list of fixes in Slate](#)—almost seven years ago.)\* These solutions are not all that expensive or complicated. Among them: giving defendants their own forensic experts, untethering crime labs from the prosecutors and cops to which they now answer, verification and standards. But no matter how many times we may reiterate that the status quo is intolerable and that simple corrections would yield significantly better data, no real energy for reform exists.

University of Virginia law professor Brandon L. Garrett, who has been studying DNA exonerations and wrongful convictions for years now, had this to say in an email: "When I looked at forensics in DNA exoneration trials, I found more often than not that the testimony was unscientific and flawed. We know that whenever we look at old criminal cases we see flawed forensics wherever we look. And yet hardly any crime labs have bothered to conduct audits. Nor is the problem limited to bad hair cases—much the same type of eyeballed comparison is done on bite marks, ballistics, fibers, and even fingerprints."

Horror stories abound. George Perrot (profiled [by Ed Pilkington of the Guardian](#)) may have spent 30 years in prison based on erroneous forensic hair testimony. [Mississippi bite-mark expert Michael West](#), about whom [Balko has written extensively](#), was shown in a recent film jamming the suspect's dental mold into the body of a young victim. [Santae Tribble](#) served 28 years for a murder based on FBI testimony about a single strand of hair. He was exonerated in 2012. It was later revealed that one of the hairs presented at trial [came from a dog](#).

And the reign of pseudoscience in the witness box hardly stops at hair and bite marks. It sweeps in the testimony of [forensic psychiatrists like James Grigson](#), nicknamed Dr. Death for his willingness to testify against capital defendants, and [flawed arson analysis](#) that may have contributed to the execution of Texas' Cameron Todd Willingham. Jurors grass-fed on *CSI-Someplace* and *Law and Order* believe uncritically in experts who throw around words like "cuticle" and "cortex," and why shouldn't they? These folks are supposed to be analysts who answer to the rules of science, not performance artists trotted out for the benefit of the prosecution.

In anticipation of big decisions on marriage equality and Obamacare, many are talking about the balance of political power on the Supreme Court. Is that fair?

Since prison-crowding and justice reform are widely touted as issues that unite the left and the right in this country, going back and retesting the evidence of those who may well have been

wrongly imprisoned should be a national priority. So far it isn't, perhaps because the scope of the enterprise is so daunting. Or perhaps because nobody really cares all that much about people who've been sitting in jail for years and years. Says Garrett: "These victims may remain unrecognized and in prison—if they still live—and the same unscientific testimony continues to be delivered without limitation. ... But hey, these are just criminal cases right?"

## **Bloomberg**

### **When Deadbeat Dads Can't Catch a Break**

by Megan McArdle

In the 1980s and 1990s, the government found itself financially supporting a lot of single-parent families in which one parent was not contributing to the support of their children. Unsurprisingly, this led authorities to crack down on "deadbeat dads," with stiff penalties for parents who didn't pay the money they owed. And that kind of situation might have helped lead to [Walter Scott's shooting death](#) on April 4. Like many poor men, [Scott owed back child support](#) that had incurred severe penalties, including stints in jail, and his family argues that he probably fled from the police during a routine traffic stop because he feared another arrest.

When you look at the havoc these policies wreak on the lives of poor people, it's obvious that there's something very wrong in the system. And yet when you try to come up with a solution that wouldn't result in these penalties, you start to see how we got here in the first place. Shouldn't parents support their children? Of course they should. Should the government be paying benefits for children when the mother or father could be contributing? Of course not; benefits are for people who can't take care of their children, not for people who don't *want* to.

So you demand that parents pay child support. But if you simply set the support at a fraction of their income, you will encourage people to work off the books and hide their incomes from the court, or get back at their ex-partners by minimizing their income so as to yield very little in the way of support checks. So judges set child support at the amount that a parent could be expected to earn working a full-time job.

Naturally, it's not enough to just mandate payment; you also have to mandate penalties, or else selfish mothers or fathers will simply refuse to pay. Punishments were set up for noncompliance, and systems were set up to automatically garnish paychecks. It all seems very fair -- unless the system makes a mistake, or Mom or Dad genuinely can't find enough work, at which point it suddenly becomes Kafkaesque. I once watched a colleague struggle through New York state's bureaucracy, which through its own screw-up had garnished so much of his paycheck that he basically had no money for food or rent. The error took months to fully resolve, because why should they care about some deadbeat dad feeding himself?

At least he was employed, and he knew he would probably get his money back. For the very poor, demands for child support can turn into an insurmountable mountain. And the penalties can actually make it harder for them to make their payments: Scott [reportedly lost a \\$35,000-a-year job](#) because the state of South Carolina misdirected his checks, then jailed him for nonpayment.

I talk a lot about the problems that arise when we try to make the law take over problems that used to be handled by community norms. Communities are capable of making fine distinctions -- between, say, a man who could pay but won't and a man who is doing his best but just can't

earn enough to cover his obligations. The law is mostly capable of indiscriminate brute force, and the results are often tragic.

Yet it's hard to see how we can get the law out of this business. Community norms were prone to failure when a parent abandoned his or her family and took off for parts unknown. And in the modern era, the breakdown of the family -- and community more generally -- means the ties that used to force people to take care of their children are no longer strong enough to do the job. So the government fills the gap, with laws that are nominally fair and reasonable but frequently deeply unjust.

## NY Times

### [1.5 Million Missing Black Men](#)

by Justin Wolfers, David Leonhardt, and Kevin Quealy

For every 100 black women not in jail, there are only 83 black men. The remaining men – 1.5 million of them – are, in a sense, **missing**.

Among cities with sizable black populations, the largest single gap is in **Ferguson, Mo.**

**North Charleston, S.C.**, has a gap larger than 75 percent of cities.

This gap – driven mostly by incarceration and early deaths – **barely exists among whites**.

In New York, almost 120,000 black men between the ages of 25 and 54 are missing from everyday life. In Chicago, 45,000 are, and more than 30,000 are missing in Philadelphia. Across the South — from North Charleston, S.C., through Georgia, Alabama and Mississippi and up into Ferguson, Mo. — hundreds of thousands more are missing.

They are missing, largely because of early deaths or because they are behind bars. Remarkably, black women who are 25 to 54 and not in jail outnumber black men in that category by 1.5 million, according to an [Upshot analysis](#). For every 100 black women in this age group living outside of jail, there are only 83 black men. Among whites, the equivalent number is 99, nearly parity.

African-American men have long been more likely to be locked up and more likely to die young, but the scale of the combined toll is nonetheless jarring. It is a measure of the deep disparities that continue to afflict black men — disparities being debated after a recent spate of killings by the police — and the gender gap is itself a further cause of social ills, leaving many communities without enough men to be fathers and husbands.

Perhaps the starkest description of the situation is this: More than one out of every six black men who today should be between 25 and 54 years old have disappeared from daily life.

“The numbers are staggering,” said [Becky Pettit](#), a professor of sociology at the University of Texas.

And what is the city with at least 10,000 black residents that has the single largest proportion of missing black men? Ferguson, Mo., where a [fatal police shooting](#) last year led to nationwide

protests and a Justice Department investigation that found widespread discrimination against black residents. Ferguson has 60 men for every 100 black women in the age group, Stephen Bronars, an economist, has [noted](#).

The gap in North Charleston, site of a [police shooting](#) this month, is also considerably more severe than the nationwide average, as is the gap in neighboring Charleston. Nationwide, the largest proportions of missing men generally can be found in the South, although there are also many similar areas across the Midwest and in many big Northeastern cities. The gaps tend to be smallest in the West.

Incarceration and early deaths are the overwhelming drivers of the gap. Of the 1.5 million missing black men from 25 to 54 — which demographers call the prime-age years — higher imprisonment rates account for almost 600,000. Almost 1 in 12 black men in this age group are behind bars, compared with 1 in 60 nonblack men in the age group, 1 in 200 black women and 1 in 500 nonblack women.

Higher mortality is the other main cause. About 900,000 fewer prime-age black men than women live in the United States, according to the census. It's impossible to know precisely how much of the difference is the result of mortality, but it appears to account for a big part. Homicide, the leading cause of death for young African-American men, plays a large role, and they also die from heart disease, respiratory disease and accidents [more often](#) than other demographic groups, including black women.

The disappearance of these men has far-reaching implications. Their absence disrupts family formation, leading both to lower marriage rates and higher rates of childbirth outside marriage, as [research](#) by Kerwin Charles, an economist at the University of Chicago, with Ming-Ching Luoh, has shown.

The black women left behind find that potential partners of the same race are scarce, while men, who face an abundant supply of potential mates, don't need to compete as hard to find one. As a result, Mr. Charles said, "men seem less likely to commit to romantic relationships, or to work hard to maintain them."

The imbalance has also forced women to rely on themselves — often alone — to support a household. In those states hit hardest by the high incarceration rates, African-American women have become more likely to work and more likely to pursue their education further than they are elsewhere.

The missing-men phenomenon began growing in the middle decades of the 20th century, and each government census over the past 50 years has recorded at least 120 prime-age black women outside of jail for every 100 black men. But the nature of the gap has changed in recent years.

Since the 1990s, death rates for young black men have dropped more than rates for other groups, notes Robert N. Anderson, the chief of mortality statistics at the Centers for Disease Control and Prevention. Both [homicides](#) and [H.I.V.-related deaths](#), which disproportionately afflict black men, have dropped. Yet the prison population has soared since 1980. In many communities, rising numbers of black men spared an early death have been offset by rising numbers behind bars.



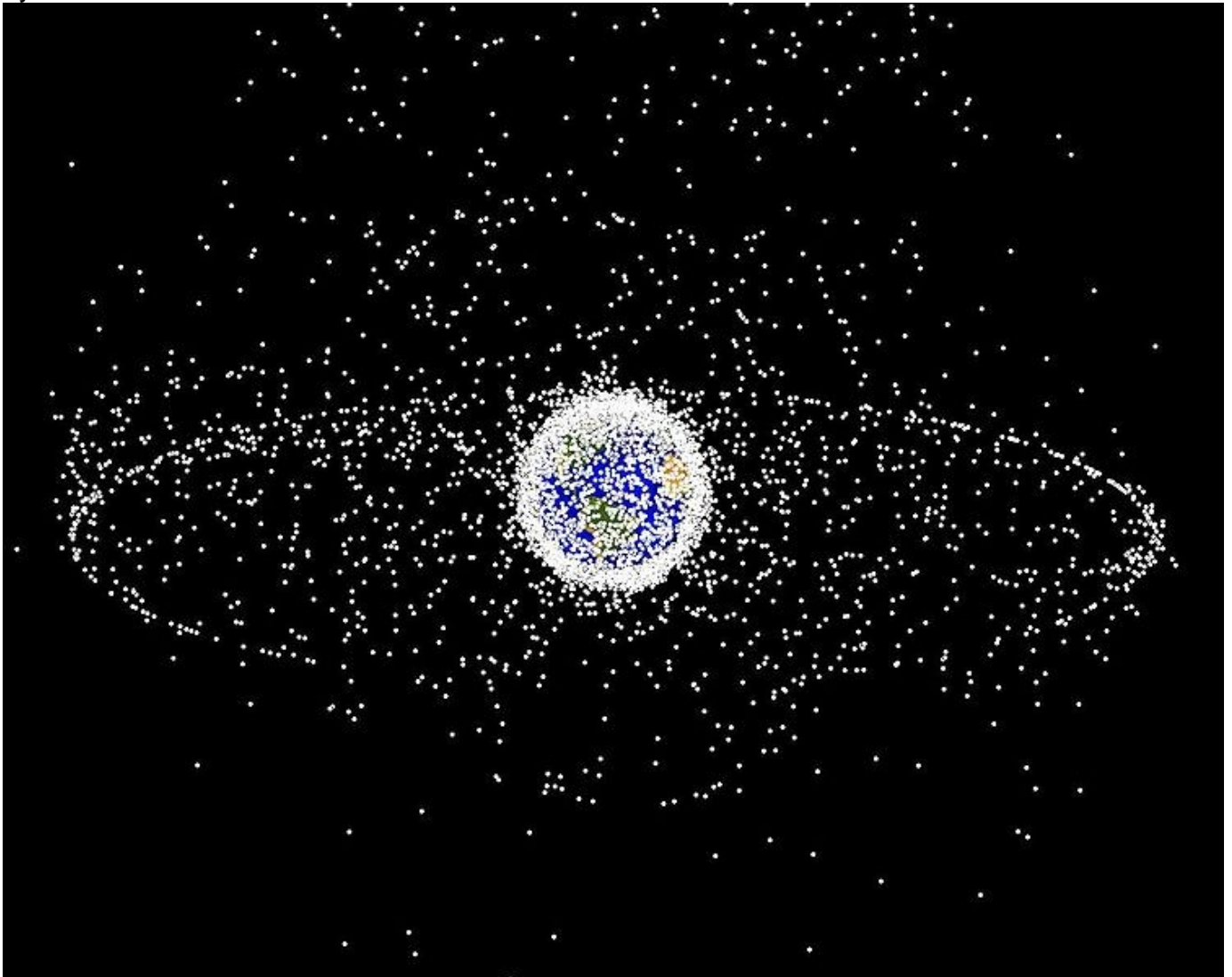
It does appear as if the number of missing black men is on the cusp of declining, albeit slowly. Death rates are continuing to fall, while the number of people in prisons — although still vastly higher than in other countries — has also [fallen](#) slightly over the last five years.

But the missing-men phenomenon will not disappear anytime soon. There are more missing African-American men nationwide than there are African-American men residing in all of New York City — or more than in Los Angeles, Philadelphia, Detroit, Houston, Washington and Boston, combined.

## Spectrum

### [Proposal Would Put Laser Cannon on ISS to Blast Space Junk](#)

by Evan Ackerman



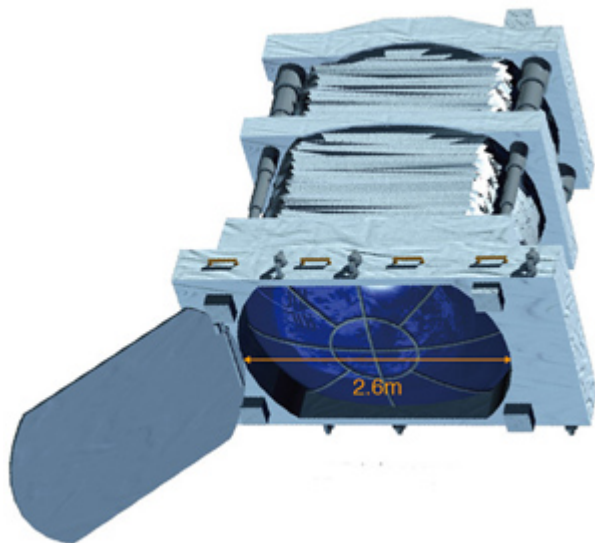
***Thousands of satellites are in orbit around the earth.***

The easiest (and probably best) way to deal with [the space junk problem](#) is to stop producing space junk in the first place. We're trying to do that, which is great. But even if space agencies and commercial launch companies all commit, tomorrow, to rockets and satellites that will deorbit themselves after no more than 25 years, there's still all kinds of debris flying around up there, threatening our orbital infrastructure.

[Many ways of dealing with orbital debris have been proposed](#), and [some are even being tried out](#). Researchers working at [RIKEN](#), a research institution in Japan, are leading an international team that wants to [put a laser cannon on the International Space Station to try to shoot down small pieces of junk on the fly](#).

One of the most difficult parts of dealing with space junk is finding it in the first place. To then shoot it with a laser at a distance of 100 kilometers or more, you have to be able to track it very precisely, which necessitates a very sensitive wide-angle optical telescope. Fortunately, the ISS is about to get one. EUSO, the Extreme Universe Space Observatory, will be installed on the ISS in 2017, and the researchers at RIKEN must have said to themselves, “hey, we could slap a laser on that thing and blast space junk.” So they’re going to give it a try.

RIKEN plans to use [a fiber laser originally developed to drive particle accelerators](#) and mount it along side of EUSO. During twilight, EUSO will look for the telltale twinkle of small bits of debris reflecting sunlight, and send targeting information to the laser, which zaps them. If a 20% scale proof of concept laser system is successful in space, a version 100 times stronger will be installed next.



“Our proposal is radically different from the more conventional approach that is ground based,” says RIKEN lead researcher Toshikazu Ebisuzaki. “We believe it is a more manageable approach that will be accurate, fast, and cheap.”

The laser wouldn’t have to utterly annihilate pieces of space junk to be effective. Instead, it performs “high-velocity plasma ablation” on junk, meaning that the laser vaporizes just a little bit off of the surface of the junk with each shot. The vaporization results in a tiny puff that acts like an itty bitty (and very short lived) rocket engine in microgravity. As long as the ISS is in a higher orbit than the space junk, or orbiting ahead of it, a few puffs is enough to cause the junk to begin to deorbit itself.

Without a bigger laser, the ISS system will only be able to handle debris up to a maximum size of about a centimeter. Centimeter-scale orbital debris is particularly dangerous, because it’s small enough to be hard to keep track of but large enough to punch holes in just about anything it hits. It’s the sort of stuff that gets created when things accidentally smash into other things and explode. [This has only happened a few times](#), but considering how much space is in space (a lot), the fact that it’s happened at *all* is testament to the amount of junk that’s flying around up

there. Beyond a certain point, there will have been enough collisions generating enough debris that there will be no way to stop a runaway chain reaction. The technical term for this is the [Kessler effect](#), and the less technical term for this is spacejunkpocalypse. And once we hit this point, it could render much of Earth orbit impassable.

One small space-based laser is certainly not going to solve the orbital debris problem. [Ultimately, it may not even be the best way to go about dealing with orbital debris at all](#). What's important is that [we're starting to experimentally determine how to tackle this problem](#), and if the full scale tests on the ISS go well, a free-flying satellite could eventually be placed into an 800km polar orbit. A dedicated system like this, according to Ebisuzaki, "could remove most of the centimeter-sized debris within five years of operation."

## Science 2.0

### [End The Summer Break Literacy Slide By Letting Kids Pick Their Summer Books](#)

Those "Diary Of A Wimpy Kid" books are not "The Good Earth", they are not going to win Pulitzer Prizes, but they are a lot better for kids in the summer than staying glued to YouTube videos. And for most kids, that is going to be the choice. Rather than sending home a reading list (poor schools) or stacks of books (rich schools) in the hopes of combating the the literacy loss experienced during the summer break, a new study finds that letting kids choose the books is better.



The study, conducted in kindergarten, first-, and second-grade classrooms in the Rochester City School District, showed that students who were allowed to choose their own summer reading saw lower levels of literacy loss over the summer months. Erin T. Kelly, M.D., the study's lead researcher, will present her findings at the Pediatric Academic Societies meeting on April 25.

"The most popular book was an adaptation of Disney's Frozen," said Erin T. Kelly, M.D., a fourth-year resident in the medicine-pediatrics program at the University of Rochester School of Medicine and Dentistry, who presented the work at the Pediatric Academic Societies meeting. "Is that going to be the best literature in the world? No. But if it's something that the children will actually read, then it's going to lead to positive outcomes."

Kelly conducted her initial study in 2013 when she arranged a book fair for 18 second-graders, who were allowed to select 13 books to bring home with them for the summer. When that class

showed improvement over a control group that had their books selected for them, she expanded the project to several classes in 2014, measuring for differences based on what portion of books the students were allowed to select themselves.

More than 75 percent of students who were allowed to select at least some of their books maintained or improved their reading levels, compared to a one-month literacy loss seen in previous studies. No significant difference was seen in students who picked all of their own books, compared with a group that selected only some.

The findings could prove especially valuable for low-income districts, said Kelly. In the Rochester City School District, only 21 percent of students are proficient on New York State's English/language arts exam, and the high school graduation rate is only 43 percent. Previous studies have shown that the summer slide accounts for roughly 80 percent of the reading achievement gap between more and less economically advantaged children.

## **Anti Social Media Week**

### **The Science of Happiness on Social Media**

Tuesday is the saddest day of the week on Twitter. I can tell you that because I'm looking at The Hedonometer, a digital graph created by data scientists to track happiness on the social network. Since 2009, The Hedonometer has been analyzing millions of tweets around the globe to calculate the average happiness levels. And those tweets have produced some very surprising results.

For example, one of the saddest days analyzed was the day Michael Jackson died. Some of the happiest days were US elections. On average, Louisiana is the saddest state. Hawaii is the happiest. If you've got more Twitter followers, you're more likely to tweet happy things, and if you use the word "office" it's likely you're feeling down.

Buried deeper in the data are even bigger insights. Happiness researchers have long known that travel makes people happy. In fact, a Dutch study found that the greatest increase in happiness came from just anticipating travel, not even the actual vacation itself. Their study found that planning a trip boosted happiness levels significantly for eight weeks prior to departure.

Twitter's handy "geo-tagging" feature lets researchers pinpoint where people are when they tweet. Users who tweet across a greater area used joyful terms like "lol" and "haha" more frequently. These happy people tended to live in cities and spend more time downtown, which suggests they have the means to travel and are wealthier. Maybe money can buy happiness after all. Or at least it can buy your ability to travel, which brings happiness. Or maybe more money just causes you to "lol" more often, it's not clear.

In fact, definitive results are in short supply for happiness researchers. One of the biggest challenges any potential happiness expert faces is how to judge whether people are happy. Do you ask them? Do you measure their brain levels? It's not entirely clear what it actually means "to be happy." It's a little like trying to determine whether we all mean the same thing when we say a painting is beautiful. How can we ever know exactly what's going on in someone else's head during a subjective experience?

Dr. Ed Diener is a pioneer in happiness research. Growing up, Diener's parents owned a large farm. As a college student, he was interested in the happiness of farm workers and proposed a study. His professor flatly refused, saying there was no way to measure happiness and even if there was, there was no way farm workers could be happy. Diener disagreed and that exchange was the spark for his creation of the "[Satisfaction with Life Scale](#)," which is now standard in the field. But even researchers who use Diener's scale would agree that subjective self-reports are inherently biased.

The data scientists who created The Hedonometer, Chris Danforth and Peter Dodds, used linguistic analysis to try and pull apart happiness. Using movie subtitles, song lyrics, newspaper articles, Twitter, and blogs, Danforth and Dodds looked at 100,000 words across 10 different languages and found a "universal positivity bias." Across the board, languages tend to use positive words more often than negative words. Some languages have even more of an upbeat slant than others though. If you're a glass half-full type of person, you might want to learn Spanish or Portuguese. If you're feeling low, Chinese might be a better fit. The type of text analyzed mattered quite a bit too. For example, English language song lyrics were significantly sadder than articles in The New York Times. That's probably why you rarely hear of someone curling up with a Sunday-edition after a breakup.

We've talked about Twitter, but what about Facebook, the mother of all social networks? It turns out that Facebook has been getting into the happiness research game itself. Researchers working for Facebook, along with colleagues at several universities, altered the newsfeeds of more than half a million users to study "emotional contagion through social networks." Put simply, that means they wanted to see if reading sad posts made you more likely to post sad things or vice versa.

Interestingly, the researchers found "that emotional states can be transferred to others... leading people to experience the same emotions without their awareness." They found that your emotions can be altered even "without direct interaction between people (exposure to a friend expressing an emotion is sufficient), and in the complete absence of nonverbal cues." So even after all the research that's been done on how to make yourself happy, that might not be enough. You also need to surround yourself with happy people too. A case of the Mondays is actually contagious.

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