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Famed Mathematician Claims Proof of 160-Year-Old Riemann Hypothesis (soylentnews.org)

Posted by BeauHD on Monday September 24, 2018 @03:07AM from the wait-and-see dept.

Slashdot reader OneHundredAndTen writes: *Sir Michael Atiyah claims to have proved the Riemann hypothesis. This is not some internet crank, but one the towering figures of mathematics in the second half of the 20th century. The thing is, he's almost 90 years old.* According to New Scientist, Atiyah is set to present his "simple proof" of the Riemann hypothesis on Monday at the Heidelberg Laureate Forum in Germany. Atiyah has received two awards often referred to as the Nobel prizes of mathematics, the Fields medal and the Abel Prize; he also served as president of the London Mathematical Society, the Royal Society and the Royal Society of Edinburgh.

"[T]he hypothesis is intimately connected to the distribution of prime numbers, those indivisible by any whole number other than themselves and one," reports New Scientist. "If the hypothesis is proven to be correct, mathematicians would be armed with a map to the location of all such prime numbers, a breakthrough with far-reaching repercussions in the field."

math mathematics numbers

→

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Score:
5
4
3
2
1
0
-1

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- **Re: If Prime locations can be methodically determi (Score:1)**
  by Anonymous Coward
  No. Encryption is unaffected by a proof that its true or false
  29 More | Reply Login
  - **Re: (Score:3)**
    by steveb321 (902811)
    ...And even [illegible]nstructive, why would knowing prime locations allow for you to factor semi-primes (the product of two primes)?
    You might know where the primes are but theres still jillions to check when you're talking about 1024bit n[illegible].
    Close
  - **Re: If Prime locations can be methodically determi (Score:5, Insightful)**
    by SharpFang (651121) on Monday September 24, 2018 @08:37AM (#57366938) Homepage Journal
    Correct - let me put it in numbers better than "jillions".
    Starting with sqrt(semi-prime) and going downwards (one of the primes must be necessarily lower-or-equal than that, the other greater-or-equal) , testing only divisibility of the number by the primes, without first finding whether a number is a prime through factorization, you're still left with ~10^151 "is x a factor of the semi-prime?"" tests - instead of ~10^155 numbers to go through "is x a prime, and if so, is x a factor of the semi-prime?".
    It's a massive reduction of computational complexity but still useless in the grand scheme of things, because 10^151 is such a ridiculously huge number. If the operation of finding the next prime and checking if the semi-prime is divisible took a single CPU cycle of a 10GHz processor in a cluster of 100,000 such processors, it would still take about 10^117 times the age of the universe.
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  - **Re: (Score:2)**
    by SCVonSteroids (2816091)
    If the operation of finding the next prime and checking if the semi-prime is divisible took a single CPU cycle of a 10GHz processor in a cluster of 100,000 such processors, it would still take about 10^117 times the age of the universe.
    Thank you for this. I always love reading about these things when defined in the terms you've set them out in.
- ›
  I hope it's real (Score:1)
  by Anonymous Coward
  Would be a shame if he went out looking like a crackpot.
  - **Re:I hope it's real (Score:5, Interesting)**
    by aleksander suur (4765615) on Monday September 24, 2018 @03:57AM (#57366424)
    If the proof is a dud or just some nonsense, it get's written off as an unfortunate case of dementia, doesn't invalidate lifetime of excellent work. If it checks out however, well solving a millennium problem at age 90 is just a cherry on top.
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    - **Re:I hope it's real (Score:5, Interesting)**
      by Kjella (173770) on Monday September 24, 2018 @04:48AM (#57366498) Homepage
      If the proof is a dud or just some nonsense, it get's written off as an unfortunate case of dementia, doesn't invalidate lifetime of excellent work. If it checks out however, well solving a millennium problem at age 90 is just a cherry on top.
      And the middle ground is still the most likely, that it'll be a plausible proof but somehow gets poked holes in. That's what happens to most people who think they've solved the big conjectures no matter their credentials. But if it stands up to scrutiny he'll rise from famed to legend.
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    - **Re:I hope it's real (Score:5, Funny)**
      by h33t l4x0r (4107715) on Monday September 24, 2018 @06:20AM (#57366598)
      Still I'm sure he's forgotten more math than anyone here will ever know.
      And I will respectfully get off his lawn in exchange for a single hard candy.
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    - **Re: (Score:2)**
      by KGIII (973947)
      "Anyone here" ... ?
      Some of us still stop by and lurk.
    - **Re: I hope it's real (Score:2)**
      by Jahoda (2715225)
      Sorry, those candies are permanently fused together the bowl. You wanted one, now you have a peppermint and butterscotch cluster.
  - **Re:I hope it's real (Score:5, Interesting)**
    by Zocalo (252965) on Monday September 24, 2018 @04:45AM (#57366492) Homepage
    I doubt that will happen. A lot of his recent mathematical claims have apparently been met with skepticism, so it's hardly surprising that this one is being treated the same, and I doubt it will change how people view his legacy. He's confident enough to go up in front of his peers and present it though, and even if he is over-looking some flaw in the proof it might still help others - or be resolved, as was the case with Andrew Wiles' proof of Fermat's last theorem. He's also claiming it's a "relatively simple proof" (echos of Fermat there!), so unlike Shinichi Mochizuki's claimed but inpeneterable proof of the ABC Conjecture at least we should know for sure pretty quickly, although that is also ringing alarm bells; long standing mathematical problems don't generally have relatively simple proofs.
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- **Elon Musk (Score:5, Interesting)**
  by darkain (749283) on Monday September 24, 2018 @03:23AM (#57366370) Homepage
  Elon Musk apparently reads Slashdot: https://twitter.com/elonmusk/s... [twitter.com]
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  - **Re: Elon Musk (Score:1)**
    by Alekos Markellos (5545276)
    Not surprised.
  - **Re: (Score:2, Funny)**
    by Anonymous Coward
    Donald Trump apparently edits Slashdot.
  - **Re: (Score:1)**
    by Anonymous Coward
    Here's his account. [slashdot.org]
    - 3 hidden comments
  - **Re: (Score:2)**
    by cascadingstylesheet (140919)
    Elon Musk apparently reads Slashdot: https://twitter.com/elonmusk/s... [twitter.com]
    Bless his heart. He must have a strong stomach.
  - **Re: (Score:2)**
    by bigpat (158134)
    Elon Musk apparently reads Slashdot: https://twitter.com/elonmusk/s... [twitter.com]
    Of course he does. Great minds crowdsource and synthesize other great (and mediocre) minds.
    Come on Elon... come clean, what is your handle?
    - 1 hidden comment
  - **Re: (Score:2)**
    by SCVonSteroids (2816091)
    "This 160 year old hypothesis might finally be proven!!!" ... yeah but... Did anyone notice Elon Fucking Musk reads Slashdot?!?!?
- **Lol (Score:5, Informative)**
  by ledow (319597) on Monday September 24, 2018 @03:42AM (#57366392) Homepage
  Ironic that Slashdot are now quoting stories from SoylentNews, because they get there first and have better coverage.
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  - **Re:Lol (Score:4, Funny)**
    by Megol (3135005) on Monday September 24, 2018 @04:17AM (#57366442)
    Yes, like rain on a wedding day.
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  - **Re: (Score:2, Informative)**
    by Anonymous Coward
    Slashdot's owners not listening to users during the beta fiasco spawned SoylentNews.
    "Get woke, go broke" [urbandictionary.com] of the new Slashdot owners has maintained and even allowed Soylent to grow.
  - **Re: (Score:2)**
    by hcs_$reboot (1536101)
    Not sure how they achieved this, but SN navigation, design, and general ergonomics are even worse than on slashdot.
  - **Re: (Score:2)**
    by AmiMoJo (196126)
    You must be new around here. Slashdot has a long, proud tradition of posting "news" a week or two after it breaks. The editors seem to hold some stories back for a while, to fill in quiet periods. Also people submit old stories that they haven't seen here just to be part of the debate.
    - **Re: (Score:2)**
      by ledow (319597)
      Look at the number of digits in the UID.
    - **Re: (Score:2)**
      by AmiMoJo (196126)
      I was being sarcastic.
- **Oh, no!!! (Score:2)**
  by LordHighExecutioner (4245243)
  This is going to break my favourite captcha [devilsworkshop.org].
- **That car you've always wanted?? (Score:2)**
  by eclectro (227083)
  You can download it for free now -- so to speak, kinda.
- **Possible, but unlikely (Score:3)**
  by swm (171547) <swmcd@world.std.com> on Monday September 24, 2018 @04:32AM (#57366470) Homepage
  A "simple" proof of the Riemann Hypothesis seems unlikely.
  This has been a marquee unsolved problem in Mathematics for over 150 years.
  Any simple proof would have been found long ago.
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    - **Re: (Score:2)**
      by hcs_$reboot (1536101)
      The guy is just being modest.
      Indeed, he proved it at 20, 70 years ago, and decided to publish it only now.
    - **Re: (Score:2)**
      by tonique (1176513)
      I think that's called *the Gaussian dementia*.
  - **Re:Possible, but unlikely (Score:5, Interesting)**
    by PolygamousRanchKid (1290638) on Monday September 24, 2018 @05:37AM (#57366554)
    Any simple proof would have been found long ago.
    Well, I took a walk by outside where the Forum is being held, and asked a participant who was outside what he thought of the talk.
    He cautioned that he was a physicist, and not fully qualified in that area, but the proof seemed to make sense to him. It is a proof by contradiction, and he could understand the contradiction.
    What is interesting, is that Atiyah was not directly looking at the Riemann Hypothesis, but was studying something else . . . and just happened to stumble across this.
    I'll see if I can stumble across some more participants, and ask them later . . . this evening, after they've had a few beers.
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- **Re: (Score:1)**
  by Anonymous Coward
  Keep in mind ... As a two times Fields prize winner, it may be "simple" to him. To the rest of us trying to wrap their heads around the synopsis of his proof may already prove too much. Let alone digging into the actual proof, which may have some of the brightest minds on the planet scratching their heads for months to come.
- **Re:Possible, but unlikely (Score:5, Insightful)**
  by Opportunist (166417) on Monday September 24, 2018 @05:42AM (#57366562)
  If an ancient, famed mathematician talks about a "simple" proof, it usually means the paper is only the size of a phone book instead of a whole library.
  They use words differently than you or me would. It's like when astronomers talk about "nearby objects".
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- **Re: (Score:2)**
  by eclectro (227083)
  Or when Astronomers say "soon" and actually mean 1 million years.
- **Re: (Score:3, Funny)**
  by Opportunist (166417)
  One sponsored by the paper industry, I'm sure.
- **Re: (Score:3)**
  by Zocalo (252965)
  I think it's probably the fittingly named "Enormous Theorem" [newscientist.com] on Symmetry that took dozens of mathemeticians decades to complete. That runs to over 15,000 pages just for the calculations, and even the "guide" runs to a further 1,200 pages.
- **Re: (Score:3)**
  by K. S. Kyosuke (729550)
  From what I know, when it comes to hand-written proofs, it's possibly the proof of this [wikipedia.org].
- **Re: (Score:2)**
  by enriquevagu (1026480)
  Actually, the proof is 15-lines long and relies on a proof-by-contradiction (similar to the proof that the number of prime numbers is infinite).
  You can find the video of the presentation here: https://www.youtube.com/watch?... [youtube.com]
- **Re: (Score:2)**
  by SCVonSteroids (2816091)
  Exactly this.
  It's like saying there's an easy fix to a bug that QA just uncovered.
  To people who understand the problem, it may seem obvious and easy, yes.
  It's dangerous wording however, because those who misunderstand the problem and/or technical details to it might interpret it as "It'll be fixed in 5 minutes." Causing those in the know-how to be under unreasonable pressure.
- **Unlikely != impossible (Score:3)**
  by sjbe (173966)
  This has been a marquee unsolved problem in Mathematics for over 150 years. Any simple proof would have been found long ago.
  Just because nobody has figured out a "simple proof" after a lot of years of trying it doesn't logically follow that one cannot exist. You had it right when you said a simple proof "seems unlikely" which the evidence would suggest is true.
- **Re:a "simple proof"? (Score:4, Interesting)**
  by Zocalo (252965) on Monday September 24, 2018 @05:06AM (#57366512) Homepage
  It *is* raising red flags, because mathemeticians are skeptical that such a well known and long standing conjecture such as Riemann could have a relatively simple proof that hasn't already been found, even without the $1m incentive to go looking. Like Fermat, I don't think we're talking about a "relatively simple proof" that will fit in the margin of a book here, but it is certainly possible that he's managed to find some new approach in the works of von Neumann, Hirzebruch, and Dirac that is still simpler than - say - Andrew Wiles' proof of Fermat's Last Theorem, let alone Shinichi Mochizuki’s claimed proof of the ABC Conjecture.
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- **Re: (Score:2)**
  by Xenna (37238)
  "even without the $1m incentive to go looking"
  What difference would a $0.001 reward make?
- **Re: (Score:1)**
  by Anonymous Coward
  Calling a proof "simple" is not an insult to a mathematician: it is a compliment.
  You think he is denigrating his work while he is really bragging in a way that is so over your head that you think it is beneath you.
  Ask me how I know you aren't a mathematician.
- **Brits question (Score:2)**
  by hcs_$reboot (1536101)
  Was he a "sir" before that, or was he "sired" because he proved that?
- **Re: (Score:2)**
  by SCVonSteroids (2816091)
  Before. It's pretty clear actually.
  Disclaimer: Not British.
- **Re: (Score:2)**
  by ledow (319597)
  "Atiyah was made a Knight Bachelor in 1983 and made a member of the Order of Merit in 1992."
  Didn't take much to Wiki that.
  He's certainly got a very impressive track record. However, there is a certain amount of doubt because the proof incorporates knowledge of his "particular" way of doing things, that's almost impenetrable to most mathematicians. To verify this is going to take a LONG time.
  As someone linked above, the second paper is the basis of the mathematics and joining the two together to any sembla
- **Caution... (Score:2)**
  by steveb3210 (962811)
  This is a famous mathematician but he's also in his late 80s and in recent years has made claims to other big open conjectures that didn't hold up to muster.
- **Re: (Score:1)**
  by Kartu (1490911)
  Care to name one of the other cases?
- **90 years old? (Score:2)**
  by sad_ (7868)
  i'm not sure what the 90 years old comment has to do with anything.
  is it meant to be positive or negative, still even haven't worked that out.
  negative - don't get your hopes up, this guy is 90 years old and probably doesn't even remember his kids names.
  positive - you're never to old to make big contributions to science/mankind.
- 1 hidden comment
- **Re: (Score:2)**
  by Hodr (219920)
  Probably just meant to be interesting, as there is a belief that most large contributions to mathematics are made earlier in one's life (obviously there are exceptions).
- **the paper? (Score:2)**
  by dagooncrn (618659)
  dunno the source https://drive.google.com/file/... [google.com]
- **Here is the paper with the proof (Score:5, Informative)**
  by SmilingBoy (686281) on Monday September 24, 2018 @07:33AM (#57366774)
  Here is the paper with the alleged proof:
  https://drive.google.com/open?id=17NBICP6OcUSucrXKNWvzLmrQpfUrEKuY [google.com]
  I never took proper mathematics at university so cannot begin to claim to understand any of it, but maybe someone else can.
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- **Re: (Score:2)**
  by SmilingBoy (686281)
  And here is a (poor-quality) video of Atiyah's presentation:
  https://twitter.com/HLForum/status/1044131411723264000 [twitter.com]
- **Re: (Score:2)**
  by SmilingBoy (686281)
  And a better quality video:
  https://www.heidelberg-laureate-forum.org/blog/video/lecture-monday-september-24-2018-sir-michael-francis-atiyah/ [heidelberg...-forum.org]
- **Re: (Score:2, Interesting)**
  by Anonymous Coward
  It "proves" the hypothesis for pretty much any function, not just the Riemann zeta function. Which... doesn't make sense. I mean, it just says "this holds for most any function, no need to even look at the Riemann zeta specifically, it's just an obvious corollary."
  It's like saying "pick any number. OK here's proof it's at most 4. This proves graphs can be four-colored."
- **Re: (Score:1)**
  by Anonymous Coward
  Here is the paper [2] he cites everywhere that does all of the heavy lifting in the proof.
  https://drive.google.com/file/d/1WPsVhtBQmdgQl25_evlGQ1mmTQE0Ww4a/view
- **Re: (Score:1)**
  by Anonymous Coward
  Just take a moment to reflect on what this paper claims to do (alpha being the fine structure constant):
  Here is what Richard Feynman had to say about alpha: Where does alpha come from; is it related
  to pi, or perhaps to e? Nobody knows, it is one of the great damn mysteries of physics: a
  magic number that comes to us with no understanding by man. You might say the hand of
  God wrote the number and we don’t know how He pushed his pencil.
  In this paper I will weave all these diverse strands together to provide a rigorous and elegant
  mathematical model of the fine structure constant alpha, or rather 1/alpha. It will be denoted by
  the Cyrillic letter zhe which I will connect both to pi and to e, answering Feynman’s plea.
  Mathematically derive one of the most fundamental physical constants from just pi and e? By a non-physicist mathematician? Sorry, but while that would be cool, it doesn't actually check out at all. Zhe is a funny looking constant, but there's absolutely no relation to the actual alpha as measured by experimental physicists. Calculating alpha according to the paper produces a result way, way off the curren
- **Re: (Score:2, Interesting)**
  by Anonymous Coward
  I am a mathematician (PhD in cryptography to be precise) and these 5 pages to me look like written by God itself, or whatever closest to the idea of.
  I am not qualified enough to comment on the subtleties of the underlying results used as building blocks (i.e., von Neumann and Hirzenbruch's works on the T function), but if this proof goes through it might easily turn out to be the legendary math achievement of this century.
  Seriously, WTF :|
  P.S.: Captcha: topology
- 1 hidden comment
- **Re: (Score:2, Funny)**
  by Anonymous Coward
  My favorite line from the proof is "a weakly analytic function of a weakly analytic function is weekly analytic". One wonders what it is on the other six days.
- **Re: (Score:1)**
  by UperPoti (832091)
  From the linked paper: "To be explicit, the proof of RH in this paper is by contradiction and this is not accepted as valid in ZF, it does require choice. I fully expect that the most general version of the Riemann Hypothesis will be an undecidable problem in the Gödel sense.", which gets as the heart of my (others?) problem with the "Millennium prize problems". They do not specify the axioms for which the "proof" should use. These prizes are based on social acceptance and not a firm mathematical basis
- **Division I (Score:2)**
  by Impy the Impiuos Imp (442658)
  While dividing by 1 is a well-defined mathematical operation, I question if "dividing" by 1, alone among all numbers, is really dividing anything at all. "Numbers only divisible by themselves" seems a better simple description and avoids the pedantry.
- 1 hidden comment
- **Re: (Score:2)**
  by danlip (737336)
  executing the check and branch may take longer than the division.
- **What of Cryptography? (Score:1)**
  by MedBob (96899)
  This would seem to have an impact on cryptography as well???
- **Re: There goes most encryption (Score:5, Informative)**
  by Anonymous Coward on Monday September 24, 2018 @03:23AM (#57366368)
  Um, no. Symmetric encryption algorithms have nothing to do with prime numbers, and the asymmetric ones that do (like RSA) aren't going to be any easier to solve just because someone proved the Riemann hypothesis. The RSA problem is prime factorisation, which is something completely different.
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- **Re: (Score:2)**
  by arglebargle_xiv (2212710)
  Also, opinion is running against him presenting a viable proof, see e.g. this commentary [spektrum.de] (in German however).
- 2 hidden comments
- **Re: (Score:1)**
  by Anonymous Coward
  Watched his presentation...Wasn't much more that what was in his preprint. He lays *some* groundwork for *a* solution to Reimann, but it's not comprehensive, and he doesn't grind out the legwork himself.
- **Re: (Score:1)**
  by Marxist Hacker 42 (638312) *
  I hope he wrote it down. At 90, the chances of him living to present the proof at all are diminishing.
- **Re: (Score:2)**
  by dave420 (699308)
  But at least you speak asshole like a native!
- **Re:There goes most encryption (Score:5, Insightful)**
  by tonique (1176513) on Monday September 24, 2018 @03:35AM (#57366382)
  To predict the prime numbers, you need *many* nontrivial zeroes of the Riemann zeta function calculated with high accuracy. How many are we talking about I have no real idea, but the one million zeroes published by Andrew Odlyzko aren't sufficient very far.
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- **Re:There goes most encryption (Score:5, Informative)**
  by m.alessandrini (1587467) on Monday September 24, 2018 @04:22AM (#57366450)
  Actually many theorems on prime numbers rely on the hypothesis that Riemann's conjecture is true. A proof of it would only confirm them.
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- **Re: (Score:2)**
  by Lisandro (799651)
  Not at all.
- **Re: (Score:2, Flamebait)**
  by SCVonSteroids (2816091)
  If the commentary is accurate, then we can kiss goodbye to a large chunk of encryption in use today. I wonder how we will adapt.
  Your interpretation of the commentary is inaccurate. You can kiss yourself goodnight and know your WoW account will still be yours when you wake-up, child.
- **Re: (Score:3)**
  by ledow (319597)
  Nope.
  https://math.stackexchange.com... [stackexchange.com]
  And elliptic curve cryptography has even less to with primes. Nor most of the "post-quantum" cryptography already available.
- **Re: (Score:2)**
  by Tulsa_Time (2430696)
  Thanks Russia.
  Isn't it great that that enemy agitators can post anonymously ?

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