

REU-CAAR: You're Done!

William Gasarch-U of MD

Thanks to All Involved:

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Clyde He helped your talks be awesome!

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Evan He gave a great talk and kept me honest!

Thanks to All Involved:

Mentors Who guided **your** brilliance with **their** expertise!

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Advice from You on How to Improve REU-CAAR

William Gasarch-U of MD

The DORMS, The Paperwork, IRB on Weekends

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PYON-CHEN Hall

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In this age, or as I call it **the age of caller-ID** since caller-ID is
the greatest invention of the 21st century. You can work on your
computers from the dorms so why do you even want to come to
IRB?

Food Glorious Food

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Food Money \$1000 does not cover the summer.

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Binary Search The last time we were funded we gave \$1500 and students had so much left over they bought swag in the bookstore the last week.

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Next year we'll try 1250.

My Teammates Didn't Really Talk To Each Other

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Me and my team were hardly in our assigned room and didn't really talk to each other.

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Alas This is a problem far beyond this program. As the quote goes:
As a society we are gaining efficiency but losing connectivity.

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But Alas we can't all be bill gasarch.

Other Social Activities than Games

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There should be more variety of group activities, not just game nights. How about a group trip to museums in DC

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In my welcome talk I recommended you to this on your own; however, I didn't stress it or follow up

Next summer I may assign some student to organize it and get it done

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Disappointed That the bicycles Bill and Clyde were on weren't penny farthings.

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Trails has a lot more money than we do.

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Does he really exist?

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Then again Erin might be up for it instead. Does she exist?

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Bill's Response How about virtual hats?

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Bill's Response Next summer: 61 muffins for 19 people, cut so that everyone gets $\frac{61}{19}$ and the smallest piece is $\frac{313}{684}$.

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Bill's Response Laxman believes this. Or he pretends to so that Trump will renew the grant.

Improve Daniel's Talk About Post-Quantum Crypto

Quote Daniel's talk was to hard and crammed to much in.

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Quote Daniel's talk was to hard and crammed to much in.

Solution

He should Retitle it:

Improve Daniel's Talk About Post-Quantum Crypto

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Solution

He should Retitle it:

How not to give a talk

More Interaction With Other Programs

TRAILS went to our lunches, some of the Wed talk, the first game night.

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Pay Students

Begin Rant

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SHOW ME THE MONEY

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The NSF should give us more money and allow us to

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Begin Rant

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Begin Rant

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Pay Students

Begin Rant

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End Rant

Upshot of Student Comments

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Quote If I could to back in time and to REU-CAAR again, I would do it again.

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Response Glad to hear it! Sounds like a terrible idea for a science fiction story.

REU-CAAR Projects for Next Summer

William Gasarch-U of MD

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Bill and Erin S

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Am I serious about working on this? **Uncertain.**

Next Summer's Projects (cont)

A New Project:

Next Summer's Projects (cont)

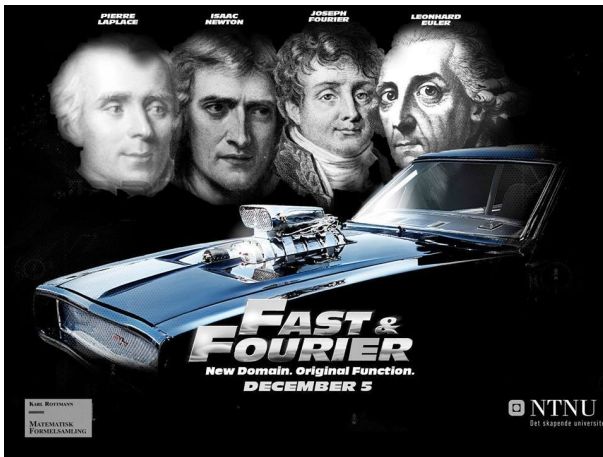
A New Project: Funded by **The Winkler Foundation**

Next Summer's Projects (cont)

A New Project: Funded by **The Winkler Foundation**
Computing Fast Fourier Transforms:

Next Summer's Projects (cont)

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Computing Fast Fourier Transforms:



Mentored by **Ming 'Vin Diesel' Lin**

NLP on Funny vs Offensive

Can an NLP make the following judgments

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If Bill says **I can't tell Ryan from Charlie**

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If Bill posts the quantum supremacy vs white supremacy article

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If Bill posts the quantum supremacy vs white supremacy article

That will get him canceled!

A Mathematical Psychology Project on Gullibility

See which of these statements students will believe.

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4. Bill was the first to say **Fortune favors the bald**.

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See which of these statements students will believe.

1. **The Diamond Industry** uses Muffin Math. (**Haverford students** believed this one).
2. The lunches are paid for by the **Colombian Drug Cartels** who gave us money a while back for a project: **max** cocaine traffic at **min** risk. **My Chairman** believes this one and has stopped asking me where my extra money comes from.
3. **My wife** was worried that the students would really believe the lunches are paid for by **The Who** in exchange for the rights to the song **I can see for miles and miles**. **TRAILS** believed it, so she had a point.
4. Bill was the first to say **Fortune favors the bald**. True?

A Mathematical Psychology Project on Gullibility (cont)

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Gullibility: The following actually happened so we will act it out for you.

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BILL Yasmine, since you are from Iran, you can't go to the talks given by the Alt Computing project since they are funded by the DOD.

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YASMINE I have to fess up, I knew you were and wanted to see how far you would take it.

A Mathematical Psychology Project on Gullibility (cont)

BILL If x is finite then the powerset of x is finite.

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If $|X| < \kappa$ then the powerset of X has size $< \kappa$.

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YUMO Are there other large cardinals?

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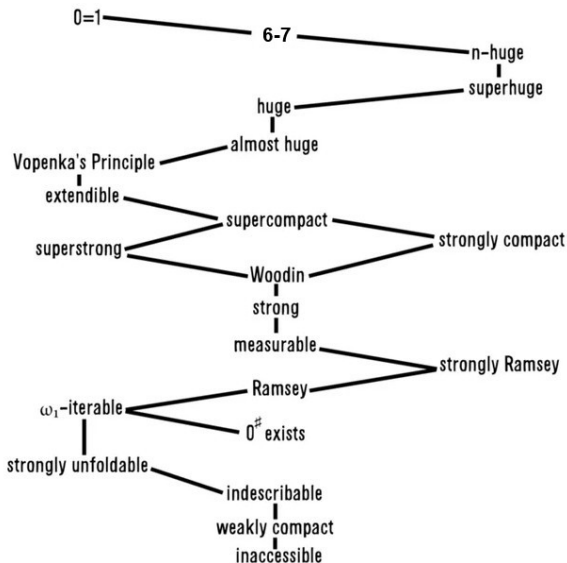
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Such sets are called **inaccessible** and are one of many types of **Large Cardinals**.

YUMO Are there other large cardinals?

BILL Yes! There is an entire hierarchy. See then next slide.

Large Cardinals



The 6-7 Cardinal

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YUMO Wow! There is a 6-7 Cardinal! I'm a 6-7 fan! (reveals shirt)

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BILL Actually the set theorist who came up with the 6-7 cardinal had a teenage son who spread the 6-7 meme. That's why it has no meaning, since Large Cardinals might not exist.

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YUMO Wow! There is a 6-7 Cardinal! I'm a 6-7 fan! (reveals shirt)

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YUMO Wow! Thats just so cool!

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YUMO Wow! Thats just so cool!

BILL Glad you like it (Thinking: She is happy thinking it, so I won't tell her that I had my TA replace 10-11 with 6-7 in the standard large cardinal diagram.)

REU-CAAR and Other Programs

William Gasarch-U of MD

Number of Students

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- ▶ This summer there were 28 students.

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- ▶ This summer there were 28 students.
- ▶ Do I want 28 students in Summer 2026?

Number of Students

- ▶ This summer there were 28 students.
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- ▶ If they are like you then **YES**

Number of Students

- ▶ This summer there were 28 students.
- ▶ Do I want 28 students in Summer 2026?
- ▶ If they are like you then **YES**
- ▶ **AWWWWWWWW**

Should the NSF Renew the Grant?

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PRO We offer many different type of projects! Yeah!

Should the NSF Renew the Grant?

PRO We offer many different type of projects! Yeah!

CON We offer many different types of projects! Boo!

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REU-CAAR is Chill?

Yes.

REU-CAAR is Chill?

Yes. But is this good or bad?

REU-CAAR is Chill?

Yes. But is this good or bad?
Next slides discuss this.

REU-CAAR is Chill: PROS and CONS I

1) We minimize formal obligations.

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CON RQS and TRAILS sometimes missed lunch and almost always missed Game Nights.

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My Opinion Not my circus, not my monkey.

Predictions

William Gasarch-U of MD

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In the future

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- ▶ Quantum computing will threaten crypto in 10 years.

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That last statement will always be true.

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Predictions

In the future

- ▶ Quantum computing will threaten crypto in 10 years.
That last statement will always be true.
- ▶ Euclidean Ramsey Theory will find an application.
To another field of math that nobody cares about.

Back to Predictions

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An AI will be built that can help direct an REU program.

Back to Predictions

An AI will be built that can help direct an REU program.

We already have one.

Back to Predictions

An AI will be built that can help direct an REU program.

We already have one. Next Slide

An AI assistant for an REU Director

An AI assistant for an REU Director

► Learning

An AI assistant for an REU Director

- ▶ Learning
- ▶ And

An AI assistant for an REU Director

- ▶ Learning
- ▶ And
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L.A.X.M.A.N

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But there are still some bugs in the program.

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But there are still some bugs in the program. See next slide.

L.A.X.M.A.N

Using reinforcement learning L.A.X.M.A.N will learn that being an REU director involves:

L.A.X.M.A.N

Using reinforcement learning L.A.X.M.A.N will learn that being an REU director involves:

1. Getting Money for Pizza.

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Using reinforcement learning L.A.X.M.A.N will learn that being an REU director involves:

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L.A.X.M.A.N

Using reinforcement learning L.A.X.M.A.N will learn that being an REU director involves:

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3. Organizing Lunches, rooms, activities, talks.

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4. Coordinating with other programs.

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Prediction L.A.X.M.A.N

L.A.X.M.A.N

Using reinforcement learning L.A.X.M.A.N will learn that being an REU director involves:

1. Getting Money for Pizza.
2. Doing admissions.
3. Organizing Lunches, rooms, activities, talks.
4. Coordinating with other programs.
5. Playing the Mayan Calendar Game.

Prediction L.A.X.M.A.N does not know what he's in for.

Academic Predictions

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In the spring of 1985 my advisor (Harry Lewis, Harvard) asked me what I dreamed of doing in the next 40 years. I said:

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Running an REU program and for one of the lunches delay the talk since the the vendor forgot the utensils and plates.

Academic Predictions

In the spring of 1985 my advisor (Harry Lewis, Harvard) asked me what I dreamed of doing in the next 40 years. I said:

Running an REU program and for one of the lunches delay the talk since the the vendor forgot the utensils and plates.

Thank you REU-2026 for making my dream come true!

Wrap This Up and Lets Hear From You!

William Gasarch-U of MD

Lets Wrap this Up

1. **Positive** thoughts or stories about the program.
2. Tell me something **interesting** about yourself.
3. Tell me something **interesting** NOT about yourself.

I'll go first. I'll give

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At least I find them interesting. **YMMV**.

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At least I find them interesting. **YMMV**.

Interesting fact 0: **YMMV** stands for **Your Mileage Might Vary**.

Positive Things About the Program

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1. You all really want to be here and got a lot out of the program.

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1. You all really want to be here and got a lot out of the program.
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Positive Things About the Program

1. You all really want to be here and got a lot out of the program.
2. Some students skipped Game Night to work on their Projects. That's awesome, though counterintuitive.
3. The lunches and pizza were great.

Positive Comment on the Program AND Interesting Fact

You will all give me a positive comment on the program and an interesting fact.
I will go first.

Interesting Fact One

In the form of a question:

What do the following people have in common:

Interesting Fact One

In the form of a question:

What do the following people have in common:

1. Actor Clint Eastwood

Interesting Fact One

In the form of a question:

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Answer on Next Slide

Answer

Answer

They were all born with great stage names.

Answer

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Side Note Stage names are often middle names followed by a street you live on. For me this works great:

Answer

They were all born with great stage names.

Side Note Stage names are often middle names followed by a street you live on. For me this works great:

William Gasarch becomes **Ian Marlow**.

Answer

They were all born with great stage names.

Side Note Stage names are often middle names followed by a street you live on. For me this works great:

William Gasarch becomes **Ian Marlow**. Awesome!

Interesting Fact Two

On TV many people who are not cops are really good at solving crimes:

We list them by category.

By Occupation

By Occupation

1. Priests (Father Brown, Father Dowling).

By Occupation

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2. Doctors (Diagnosis Murder, Quincy)

By Occupation

1. Priests (Father Brown, Father Dowling).
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3. Mystery Writers (Murder She Wrote, Castle)

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7. Cooks (Murder She Baked)

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8. Food Critics (The Gourmet Detective)

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8. Food Critics (The Gourmet Detective)
9. Caterer's (Curious Caterer)

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10. Hairdressers (Shakespeare and Hathaway)

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8. Food Critics (The Gourmet Detective)
9. Caterer's (Curious Caterer)
10. Hairdressers (Shakespeare and Hathaway)
11. Mathematician (Numb3rs)

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11. Mathematician (Numb3rs)
12. Hollywood Stuntman (The Fall Guy)

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10. Hairdressers (Shakespeare and Hathaway)
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12. Hollywood Stuntman (The Fall Guy)
13. Stage Magicians (The Magician-it lasted only one season)

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14. Antique Dealers (Garage Sale Mystery AND Madame Blanc)

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13. Stage Magicians (The Magician-it lasted only one season)
14. Antique Dealers (Garage Sale Mystery AND Madame Blanc)
15. Lawyers (McBride, Matlock, Matlock)

Has Some Advantage

Has Some Advantage

1. People with OCD who are police consultants.
(Monk,Holmes(?). Do Police Consultants exist?)

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8. In 1899 4 Outlaws and the Sheriff who was about to capture them are struck by lightning in an Indian Burial Ground and end up in 1986— where the 5 of them agree to a truce and form their own detective agency. (The Outlaws—it lasted 13 episodes.)

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He has already written the main song. I will go to my website to play it for you.

Your Turn

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