REU-CAAR: You’re Done!

William Gasarch-U of MD
Thanks to All Involved:

- Clyde
- Jodie
- Auguste
- Sharron
- Robert
Thanks to All Involved:

Clyde He helped your talks be awesome!
Thanks to All Involved:

**Clyde** He helped your talks be awesome!

**Jodie** She got you paid!
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**Auguste** He was my helper!
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**Sharron** Budget, Rooms, Other Stuff!
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**Sharron** Budget, Rooms, Other Stuff!

**Robert** He was Sharron’s Helper!
Thanks to All Involved:

Paul Who brought cool and complicated games to game night!
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Mentors  Who guided your brilliance with their expertise!
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ALL OF YOU!
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ALL OF YOU! Without you ...
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**Dept, NSF, Zhu/Google, Iribe/Ocular, Winkler Found $$$$$$**

**ALL OF YOU!** Without you . . . there wouldn’t be a program!
Did the Program Achieve its Goals

1. None of the NSF-funded students died!
2. Bonus: None of the non-NSF-funded students died!
3. All students learned things. For some definition of learned.
4. All students did things. For some definition of did.
5. Key-card access for non-citizens came! Yeah!
6. Those cards didn't have students face on them! Boo!
7. Some of the key-cards never worked! Boo!
8. Some students liked being nomads, wandering around looking for rooms. It may help them survive in the global warming apocalypse. Yeah!
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Advice from You on How to Improve REU-CAAR

William Gasarch-U of MD
1. **The Hat Problem**: Students should have to wear hats.

   **Bill's Response**: How about Virtual Hats?

2. **The Muffin Problem**: Need more variety of Muffins.

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

3. **Bill should lie less**. I actually believed Joe Biden worked on quantum error correction.

   **Bill's Response**: Joe dropped out to spend more time with his quantum research!

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   **Bill's Response**: Victor, the quantum mentor, believes this.
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Food!

Welcome: Pizza.
Quantum: Pizza.
AI: Pizza.

Students
Why are the extra lunches always at Potomac Pizza?

Bill
On the one hand, a wise man once said Variety is the Spice of Life.

Bill
On the other hand That wise Man was not me.

Students
Finally a quote you won't claim for your own!
Food!

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*Variety is the **Spice** of Life.*

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*That **wise Man** was not me.*

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*Variety is the *Spice* of *Life*. *

**Bill** On the other hand

*That wise *Man* was not me.*

**Students** Finally a quote you won’t claim for your own!
Social Activities with Other Programs

1. PRO
   If you dislike the people in REU-CAAR you may find more people to dislike.

2. NOT NEEDED?
   There are 21 people in REU-CAAR so don't really need more social interaction.

3. LOGISTICS
   Lunches cost money. Game Night might get unwieldy with REU-CAAR and REU-MATH and REU-BRIDGE and TRAILS.
   On the other hand, only about half of you come anyway.

4. Hard to force people to be social.
   Will confer with the other REU/TRAILS directors about this.
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Pay the Unpaid Students

1. What's the point of having unpaid students if you are going to pay them?

Begin Rant

The NSF should give us more money and allow us to pay HS students AND non-citizens AND have more slots so we can let more people in.

End Rant
Pay the Unpaid Students

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2. Begin Rant
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**End Rant**
More Interaction With Other REU Groups

I tried to do this.
More Interaction With Other REU Groups

I tried to do this.
But getting the other REU-directors to cooperate was like

Pulling Teeth.
Herding Cats.
Pulling Cats Teeth.
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REU-CAAR Projects for Next Summer

William Gasarch-U of MD
Next Summer’s Projects

Bill and Sajjad and Jon
Next Summer’s Projects

Bill and Sajjad and Jon

Project Quantum Ramsey Theory.
Next Summer’s Projects

Bill and Sajjad and Jon
Project Quantum Ramsey Theory.
Write the Grant
Next Summer’s Projects

Bill and Sajjad and Jon
Project Quantum Ramsey Theory.
Write the Grant
It will get funded
Next Summer’s Projects

Bill and Sajjad and Jon

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Write the Grant
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The figure out what Quantum Ramsey Theory is.
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Am I serious?
Next Summer’s Projects

Bill and Sajjad and Jon
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Am I serious? Uncertain.
Next Summer’s Projects (cont)

A New Project:

Funded by The Winkler Foundation
Computing Fast Fourier Transforms: Mentored by Aviva ‘Vin Diesel’ Prins
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)

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

Mentored by **Aviva ‘Vin Diesel’ Prins**
Can an NLP make the following judgments:

- The only people who were kicked out of REU-CAAR were white guys from Harvard, so I am keeping a close watch on Alex. That's funny!
- I can't tell Sarah from Lucy. That's racist!
- I can't tell Jakin from Bea. That's okay! Since one is Chinese and one is Indian.
- If Bill can't tell which one is Chinese which one is Indian, that's Bill!
NLP on Funny vs Offensive

Can an NLP make the following judgments:
If Bill says "The only people who were kicked out of REU-CAAR where white guys from Harvard, so I am keeping a close watch on Alex"

If Bill says "I can't tell Sarah from Lucy"
That's racist!

If Bill says "I can't tell Jakin from Bea"
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*That’s okay! Since one is Chinese and one is Indian.*
If Bill can’t tell which one is Chinese which one is Indian
*That’s Bill!*
A Mathematical Psychology Project on Gullibility

See which of these statements students will believe.

1. The Diamond Industry uses Muffin Math. (Haverford students believed this one).
2. Auguste has 11 siblings whose names are January, February, . . . , December. (Sharron believes this one.)
3. 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.)
4. After learning why the Quintic could not be solved, Bill became a Hobo for a year. (Auguste believes this one.)
5. Bill was the first to say Fortune favors the bold. (My Ramsey Gang believe this one.)
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AI Project on Adversarial Networks

Mostly Excellent

Advanced Network Project is in two phases
1. HS phase: Train M.E.G.A.N to solve problems in HS geometry.
2. REU phase: Train M.E.G.A.N to solve problems in Hilbert geometry.
AI Project on Adversarial Networks

- Mostly

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AI Project on Adversarial Networks

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- Excellent
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- Excellent
- Geometric
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2. REU phase: Train M.E.G.A.N to solve problems in Hilbert geometry.
REU-CAAR and Other Programs

William Gasarch-U of MD
Number of Students

- Most REU programs have around 200 applying
- Most REU programs take 10 students

Do I really want 21 students in Summer 2025?
If they are like you then YES
Number of Students

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- We have 470 applying.
- We take 21 students. (5 were not paid)
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If they are like you then YES
AWWWWWWWW
Erin Claims REU-CAAR is Chill

Erin Molloy is a young comp bio professor.
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ERIN I want to work in REU-CAAR rather than REU-BRIDGE
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**ERIN** I want to work in REU-CAAR rather than REU-BRIDGE.

**BILL** Why? REU-BRIDGE does Comp Bio where as we do . . . a lot of stuff.
Erin Molloy is a young comp bio professor.

ERIN I want to work in REU-CAAR rather than REU-BRIDGE

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ERIN REU-CAAR is chill!
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**ERIN** I want to work in REU-CAAR rather than REU-BRIDGE

**BILL** Why? REU-BRIDGE does Comp Bio where as we do . . . a lot of stuff.

**ERIN** REU-CAAR is chill!

**BILL** What does that mean?
Erin Molloy is a young comp bio professor.

ERIN I want to work in REU-CAAR rather than REU-BRIDGE

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ERIN REU-CAAR is chill!

BILL What does that mean?

ERIN How old are you?
Erin Claims REU-CAAR is Chill

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ERIN Cool!
IS REU-CAAR is Chill?

Compared to REU-BRIDGE the answer is yes.
IS REU-CAAR is Chill?

Compared to REU-BRIDGE the answer is yes. But is this good or bad?
IS REU-CAAR is Chill?

Compared to REU-BRIDGE the answer is yes. But is this good or bad? Next slides discuss this.
1) We allow students to be in the program multiple times (REU-BRIDGE does not.)

PRO: Quantum! ML! AI! Comp Geom! Algorithms! Synergy!

CON: Admissions harder! Mentors don't know each other.

PRO: Less formal meetings, more research

CON: In past years some projects drifted (not this year).
1) We allow students to be in the program multiple times (REU-BRIDGE does not.)
While not many students have been in the program twice, those that were had a good reason for it: Non-citizens who other programs don’t take, and serious family reasons to stay in the area.
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2) We have a variety of topics.
REU-CAAR is Chill: PROS and CONS

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More on the next slide.
4) Projects flexible: Aviva’s project and Andrew’s Project
5) Number of students on a project is flexible: Auguste-7, Victor-1.
6) Relaxed attitude about people going to lunches, talks, game nights, and leaving the program early.
7) We do some things that perhaps we should not. I will discuss this over lunch but not on the slides since, as criminals on TV advise, don’t write anything down. I will give a hint about one of them.
Ethan is learning how to sing I turned 21 in prison, doing life without parole.
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Predictions

William Gasarch-U of MD
Predictions

In the future

▶ Quantum computing will threaten crypto in 10 years. That last statement will always be true.

▶ Computational Hilbert Geometry will find an application. To another field of math that nobody cares about.

▶ None of Anuba, Auguste, or Bill will have an EGOT (Emmy, Grammy, Oscar and Tony).

▶ An AI will be built that can direct an REU program. We already have one.
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Automated REU Director

But there are still some bugs in the program. See next slide.
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Prediction for A.U.G.U.S.T.E

A.U.G.U.S.T.E thinks REU directors do the following with the students:

1. Rock Climbing
2. Badminton
3. Seeing Baltimore
4. Buying Ice Cream, Cake, and Ice Cream Cake.
5. Eating Ice Cream, Cake, and Ice Cream Cake.

He will learn that it is mostly:

2. Writing Grants, Forming a Budget.
3. Doing admissions for 470 students.
4. Organizing Lunches, rooms, activities, talks.
5. Telling the students to text the other students to get to a lunch or a talk.

Prediction A.U.G.U.S.T.E will be a Great REU director.
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**Prediction** A.U.G.U.S.T.E will be a **Great** REU director.
Academic Predictions

In the spring of 1985 my advisor (Harry Lewis, Harvard) asked me what I dreamed of doing in the next 38 years. I said: Running an REU program where I have to make admissions decisions while not knowing if one of the mentors is funded. Thank you REU-2024 for making my dream come true!
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Wrap This Up and Let's Hear From You!

William Gasarch-U of MD
Let's Wrap this Up

1. Positive thoughts or stories about the program.
2. Tell me something interesting.

I’ll go first.
Positive Things About the Program

1. You all really want to be here and got a lot out of the program.
2. The Wed Talks were all good.
3. The lunches and pizza were great.

A.U.G.U.S.T.E Disagrees about the food being good. I'm right and he's wrong.
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Interesting Fact One

In the form of a question:
What do the following people have in common:

1. Actor Clint Eastwood.
2. Singer Dolly Parton.
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They were all born with great stage names.
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**Side Note** Stage names are often middle names followed by a street you live on. For me this works great:
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**William Gasarch** becomes **Ian Marlow**.
Interesting Fact Two. Part I

On TV the following people are really good at solving crimes:

1. Priests (Father Brown, Father Dowling).
2. The Devil (Lucifer).
3. Doctors (Diagnosis Murder, Quincy).
4. People with OCD. (Monk, Holmes(?)).
5. Blind Detectives (Longstreet, Blind Justice. Actor not blind.)
7. Deaf FBI agents (Sue Thomas. Actress is deaf.).
8. Fat private Detectives (Cannon, Jake and the Fat Man. Actor is fat.).
10. Real Psychics (Medium, Ghost Whisperer).
11. Mystery Writers (Murder She Wrote, Castle).
12. Owner of a Mystery book store (Mystery Women).
13. Librarian with an MS on real crimes fiction (Arora Teagarden).
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The following people have a song about them to the tune of Hamilton:

1. Captain America
2. Batman
3. William Rowan Hamilton
4. Jesus
5. Angela Merkel (prior Chancellor of Germany)
6. Isaac Newton
7. Luke Skywalker
8. Donald Trump
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11. Weird Al Yankovic

Weird Al had his own version of Hamilton as well.

There are many more parodies of Hamilton and other songs from Hamilton.
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Your Turn

I will call on everyone. They will tell me
Your Turn

I will call on everyone. They will tell me

1. Something positive about the program.
Your Turn

I will call on everyone. They will tell me

1. Something positive about the program.
2. Something interesting.