REU-CAAR: You’re Here!

William Gasarch-U of MD
Credit where Credit is Due

Origin of this talk
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▶ Bill G modified this *boring* handbook into a *fascinating* 120-slide talk!
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▶ Bill G modified this boring handbook into a fascinating 120-slide talk!

John Dickerson: Why are you telling them all that?
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Origin of this talk

- Bill G modified this *boring* handbook into a *fascinating* 120-slide talk!

**John Dickerson:** Why are you telling them all that?
**Bill Gasarch:** In academia its very important to credit past work.
Purpose of This Talk

1. Who are the mentors?
2. Who are the students?
3. What are the projects?
4. What is expected of you?
5. What should you expect of us?
6. Nuts and bolts of how the program works.
7. Advice on how to get the most out of this summer!
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REU-CAAR

REU: Research Experience for Undergraduates.
CAAR: Combinatorics And Algorithms for Real Problems.
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The Title Encompasses... All of Computer Science!
However We mean CS that uses Math.
But That still seems to cover all of CS.
However We mean Quantum Computing, Crypto, and ML.
REU-CAAR TEAMS

1. Simulation of Low Depth Quantum Circuits:
Mentors: Gorjan Alagic and Matthew Coudron.
Students: Celia, Sangheon, Shi, Suchetan.
Bill: Either QC will be able to do cool things OR its failure to do so will lead to breakthroughs in Physics! Its a WIN-WIN!

2. Diversity in Matching Markets
Mentor: John Dickerson.
Students: George, Nathan, Bradon, Olufemi.
Bill: Using ML to CORRECT bias rather than cause it!

3. Using Gen Adv Networks in Domain Adaptation
Mentor: Soheil Feizi.
Students: Jasmine, Sam, Sophya, Wester.
Bill: Fighting AND creating Deep Fakes!
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   **Mentors** Anirunda Bapat, Eddie Schoute, Alexey Gorshkov, Andrew Childs.
   **Students** Sam, Nicole, Mason

2. Understanding bias and fairness in NN via visualization
   **Mentor** Tom Goldstein
   **Students** Rachel and Tiye.
   Bill
   Using Visualization to DETECT bias!

3. Learning Fair Representation:
   **Mentor** Furong Huang.
   **Students** George, Zora, Ngan.
   (Biased Data) − (Bias) = (Unbiased Data).
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REU Projects

1. Something in Crypto
Mentor Jon Katz.
Students Blake. Bill
Jon told me about this in code. I need to factor 8,616,460,799 to find out about it.

2. Adversarial Machine Learning
Mentor Jon Katz.
Students Joshua, Nithyasree, Emily
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   **Bill** How hard is the problem of un-biasing data?
Overall Bill Comment

Bill’s Overall Comment

This Summer’s Projects are Biased Towards Dealing With Bias!
Staff

- **Large and In Charge** Bill Gasarch gasarch@umd.edu
- **Second in Command** John Dickerson john@cs.umd.edu
- **Your Stipend** Jodie Grey jgray2@umd.edu
- **Lots of Stuff** Sharron McElroy sharron@umd.edu
- **Activities and Talks** Bill and John
- **Preparing your final Talks** Clyde ckruskal@umd.edu
Program Goals

1. **Research!** What is Research? Discuss!

   - Work on problems where the answers are not already known.
   - Expose you to a variety of career paths (grad school, industry, hobo, other).
   - Build skills (team work, communication, project management).
   - Build a network with faculty and students. Useful for the future!
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What the Program Expects of You (I)

1. Show up every weekday. On time and sober.  
   10:00AM-4:00PM

Really? That only makes sense in non-virtual program.

Students meet with each other often on Skype or Zoom or Slack or Facebook or whatever-the-cool-kids-use-nowadays and work together.

2. Mentors meet with the students regularly and give them ACTION ITEMS. Their job is to make sure you always have things to do.

3. Students and Mentors respond to email promptly. More important since the entire program is virtual.

4. Actively contribute to your research project and your team.
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2. Monday - all meet for chat, math puzzles, or discussions.

3. Wed - all meet for a talk.

4. I will meet each group once every two weeks to check on how things are going.

5. I will also have groups meet with each other. This is all to be worked out.

6. Participate in assessments such as surveys.

7. Give a presentation of your work late in the summer.
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2. **Time:** Explain the project, answer questions, listen to your concerns and ideas, etc.

3. **Background:** Explain why the research is important! How it fits into other things!

4. **Connection:** Help connect you to their colleagues, graduate assistants, others. You will learn as much from them (or more!) as you do from your research tasks!
What Faculty Mentors Expect from You

1. **Enthusiasm:**
   - Be interested in the project, field, and topic.
   - Become familiar with background literature.

2. **Assertiveness:**
   - Think for yourself and support your own ideas.

3. **Adaptability:**
   - Be flexible/open minded.

4. **Maturity:**
   - Be reliable, and cooperative. Own your mistakes.

5. **Communication:**
   - Be clear in verbal & written communication.
   - Seek clarification, ask questions, provide suggestions.

6. **Responsible:**
   - Tell team changes that affect your participation.

7. **Be Bold/Curious:**
   - Be Bold and Curious!

8. **Respect:**
   - Resolve issues quickly, directly, and respectfully.
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Sexual Harassment and Discrimination

(My second least favorite topic.)

1. Ask other REU members about their perceptions of the behavior. If their perceptions are similar then next step.
2. Speak directly to the individual in a respectful manner. This will let you immediately know if the different treatment is a misunderstanding or a major problem.
3. If you feel uncomfortable, seek advice and guidance from others. Bill Gasarch or John Dickerson can offer assistance and direct you to campus resources for help.
4. While this slide is about Sexual Harassment and Discrimination, feel free to talk to Bill Gasarch or John Dickerson about any issue, even if it is uncomfortable.
5. This program is in its 8th year and this has never been an issue.
6. This year the program is virtual so seems even less likely to be an issue (though there is cyber-bullying).
Sexual Harassment and Discrimination

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2. Speak directly to the individual in a respectful manner. This will let you immediately know if the different treatment is a misunderstanding or a major problem.

3. If you feel uncomfortable, seek advice and guidance from others. Bill Gasarch or John Dickerson can offer assistance and direct you to campus resources for help.

4. While this slide is about Sexual Harassment and Discrimination, feel free to talk to Bill Gasarch or John Dickerson about any issue, even if it is uncomfortable.

5. This program is in its 8th year and this has never been an issue.

6. This year the program is virtual so seems even less likely to be an issue (though there is cyber-bullying).
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First Two Weeks

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3. Next week Monday- A lunch activity! (Time not yet determined.)
4. No **Bootcamp**— Our projects are to diverse.
Most Weeks

1. Start work with your team at 10:00 AM (if different time zones you can adjust this but have a set time)
2. Research from 10:00 AM to 4:00 PM with a break for lunch. CAN work longer!
3. Friendly get together on Monday's (not sure when yet).
4. Talks on Wednesday's.
5. Meet on Zoom at night to talk about applying ML to Quantum Teleportation and Crypto To Combat Bias,
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My Least Favorite Topic

Discuss- what do you think is my least favorite topic?
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**Good News That You Know** You get $6000 Stipend.
My Least Favorite Topic

Discuss- what do you think is my least favorite topic?

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If you do not live up to your end of the deal
Discuss- what do you think is my least favorite topic?

**Good News That You Know** You get $6000 Stipend.

**If you do not live up to your end of the deal**
You could be asked to leave, which will mean you get less of your stipend. RARE! But it has happened and it has to be said.
Discuss- what do you think is my least favorite topic?

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**If you do not live up to your end of the deal**
You could be asked to leave, which will mean you get less of your stipend. RARE! But it has happened and it has to be said. (It has happened twice, and the last time was 7 years ago.)
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**What is ‘your end of the deal’:**
My Least Favorite Topic

Discuss- what do you think is my least favorite topic?

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You could be asked to leave, which will mean you get less of your stipend. RARE! But it has happened and it has to be said. (It has happened twice, and the last time was 7 years ago.)

**What is ‘your end of the deal’:**
Discuss.
HS Students

1. There are some HS students on some of the project.
2. There are other HS students working on other projects.
3. The HS students may join some of our activities.
Complain SOONER Rather than Later
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Key to a good relationship:
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In any problem or dispute that arises the important thing is
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In any problem or dispute that arises the important thing is

NOT fixing it and making things work out
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its finding whose to Blame :-}
Most Common Complaints

Students Most Common Complaint
Mentors who do not respond to emails in a timely manner.

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Let me or John D know soon if this is a problem.
Most Common Complaints

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**Students Most Common Complaint**  Mentors who do not respond to emails in a timely manner.

**Mentors Most Common Complaint**  Students who do not respond to emails in a timely manner.

Let me or John D know *soon* if this is a problem.
Who is Funding This?

1. National Science Foundation (NSF).
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5. The Winkler Foundation.
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5. The Winkler Foundation. What?
Irwin Winkler

Bill Gasarch’s Mother is Pearl (Nee Winkler) Gasarch
Irwin Winkler

Bill Gasarch’s Mother is Pearl (Nee Winkler) Gasarch

Pearl Gasarch’s Brother is Irwin Winkler

Irwin Winkler is a producer in Hollywood.

1. Produced ∼ 55 movies
2. Directed ∼ 7 movies
3. David Selznick Lifetime achievement award for producing.
4. Produced Rocky++, Goodfellows, Creed, The Wolf of Wall Street

Why am I telling you this?
Irwin Winkler

Bill Gasarch’s Mother is Pearl (Nee Winkler) Gasarch

Pearl Gasarch’s Brother is Irwin Winkler

Irwin Winkler is a producer in Hollywood.
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Why am I telling you this?
Irwin Winkler has established a Charitable foundation that gives money to many worth causes AND also to our REU!
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Adam Winkler is Irwin’s son who administers the foundation. He’s a law prof so he gets academia. (The other 2 sons: showbiz.)
Questions from You?

I welcome questions now and anytime!