REU PROGRAMS!

William Gasarch-U of MD

REU = Research Experience for Undergraduates

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But everything I say applies also to

1. My REU program, REU-CAAR.

2. Other REU programs at UMCP.

3. Grad School.

We will revisit the comparisons later.

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The NSF funds **many** of these programs in STEM areas.

1. **Target:** ugrads who are not seniors (some exceptions)
2. **How Many:** NSF-10 students, some have additional funds.
3. **Where:** On a college campus.
4. **Stipend:** $7000 + Free Dorm Room + transportation.
5. **How Long/When:** 10 weeks over the Summer.
6. **Main Activity:** Research. See next slide.

Examples of Comp Sci REU Programs

1. Applying Theory to Practice (thats mine, REU-CAAR)
2. Parallel and Distributed computing
3. Robotics
4. Big Data, Security, and Privacy
5. Interdisciplinary Software Enginnering
6. Systems: High Performance Computing
7. Medical Informatics
8. Machine Learning
9. Security of Smart Things
10. Computational Biology (REU-BRIDGE is also a UMCP program)
11. There are more.

Examples of Comp Sci REU Programs

Can find the entire list of Comp Sci REU programs by doing Googling

NSF REU

REU Research

You work all summer on a research project

1. Research in groups of 2-5 students and a faculty mentor.
2. The faculty mentor gives you the problem to work on.
3. But then its on you!

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4. Give a research presentation.

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4. **Connection:** Connect you to their colleagues and others.

REU programs and Grad School

An REU program is like Grad School in miniature.

1. In Grad School after you finish your course work and are doing research full time you are exploring questions whose answers are unknown.

2. In Grad School you are self-motivated.

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Next Slide has examples of projects.

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1. **Parallelism** If an algorithm takes T steps on a sequential machine then how well can you do on a parallel machine with p processors. T/p would be great but it unlikely. How close can we get? **Prereq** Algorithms and systems programming (C, C++)

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3. **Cryptography** There are crypto systems that claim they are secure. Maybe they are. Maybe they are not. The project will attack these systems using non-traditional methods to see what works. **Prereq** Math Maturity, linear algebra. Crypto is (oddly enough) not needed as you will pick it up as you go.

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2. **Finding Good and Bad Inputs for Natural Lang Processing** Translation programs do very well on some inputs and badly on others. Which ones to they do well on? badly on? Why? Find out!

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1. **Classical and Quantum Error Correction** One key aspect of modern computing is error correction: if a string of bits is transmitted over a noisy line there are ways to send it so that errors can be detected and corrected. For Quantum this problem is still hard. So solve it! **Prereq** Linear Algebra, Quantum Computing, Quantum Mechanics.

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2. **Quantum Graph Games** There are cooperative games that two players can do much better if they are sharing an entangled quantum bit. This project will study variants of such games.