

Computer Systems Research

Ardalan Amiri Sani

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Finding the “right way” to build systems

What does it take?

- **Systems programming**
 - Programming (i.e., hacking) the OS kernel, hypervisor, core system services, drivers, etc.

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- **Systems programming**
 - Programming (i.e., hacking) the OS kernel, hypervisor, core system services, drivers, etc.
- **Countless hours**
 - Often a bug can take days or weeks to fix

Then why should you do it?

- Acquire valuable expertise

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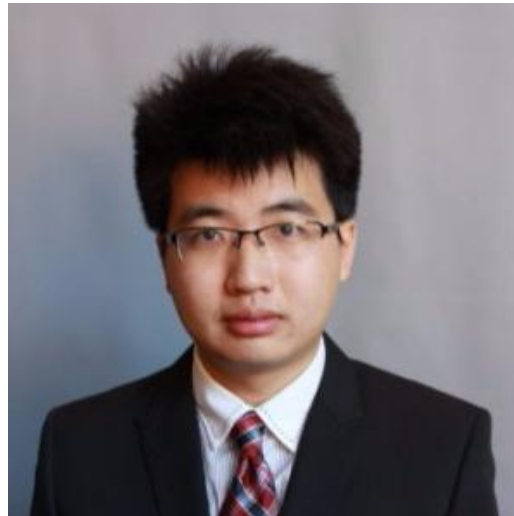
- Acquire valuable expertise
- Experience the satisfaction of fixing a bug, and even better, make a difficult system work

Then why should you do it?

- Acquire valuable expertise
- Experience the satisfaction of fixing a bug, and even better, make a difficult system work
- The Turtles Project from OSDI'10
 - The authors did it simply because someone told them it can't be done
 - Now their code is integrated in Linux kernel

My great experience with ICS honors students

- Zongheng Ma



My great experience with ICS honors students

- Zongheng Ma
 - First author on our HotMobile'17 paper
 - Second author on our recent ASPLOS'18 paper

My great experience with ICS honors students

- Zhihao (Zephyr) Yao



My great experience with ICS honors students

- Zhihao (Zephyr) Yao
 - First author on our ASPLOS'18 paper
 - Now a PhD student in my group
 - First author on our CCS'18 paper

My great experience with ICS honors students

- Yuxin (Myles) Liu



My great experience with ICS honors students

- Yuxin (Myles) Liu
 - Second author on a paper under submission

My great experience with ICS honors students

- Meta Novitia



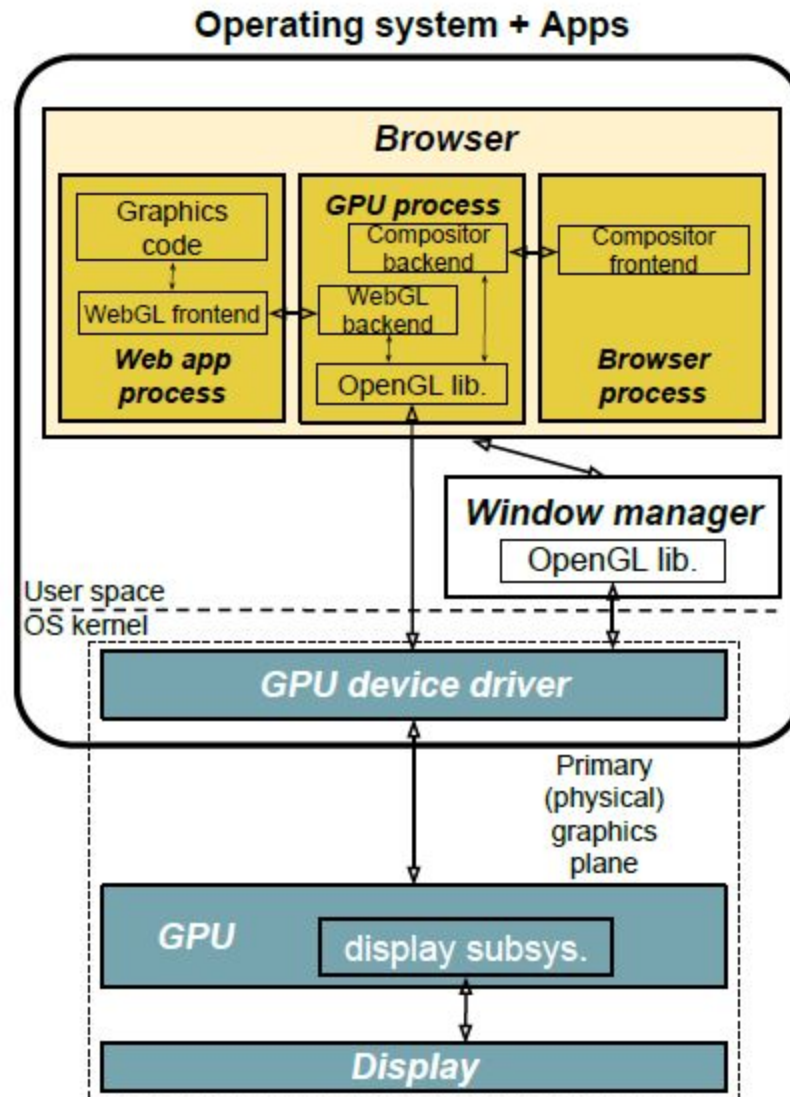
My great experience with ICS honors students

- Meta Novitia
 - Making great contributions to a project, which we will submit to a top conference (and she will be the second author)

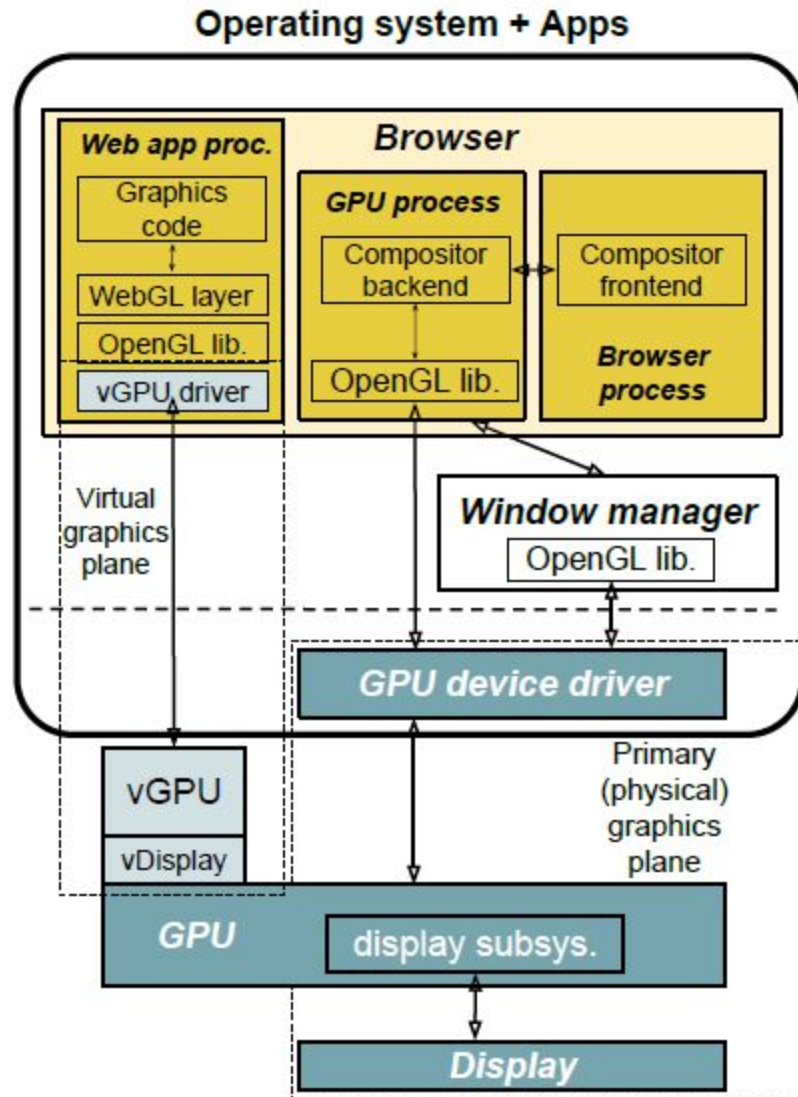
Sugar: secure GPU acceleration for web browsers

- WebGL allows web apps to perform hardware accelerated 3D rendering using the power GPU
- Unfortunately, WebGL raises a lot of security concerns

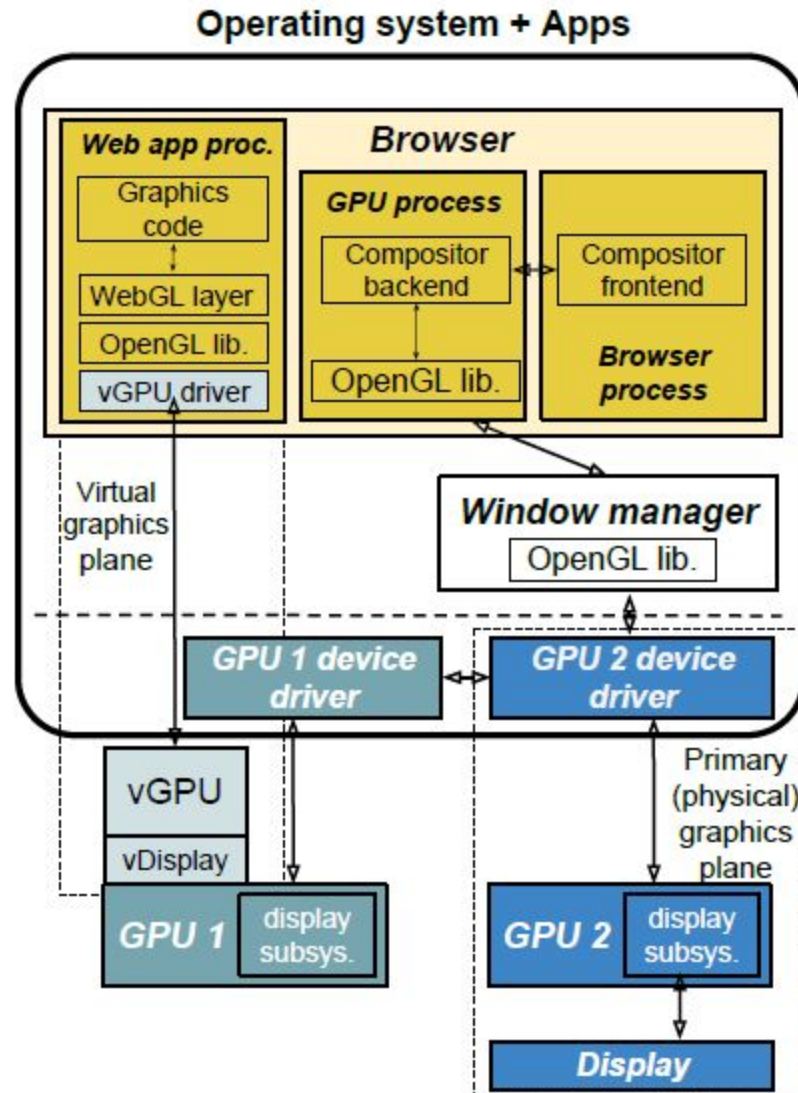
What is the problem?



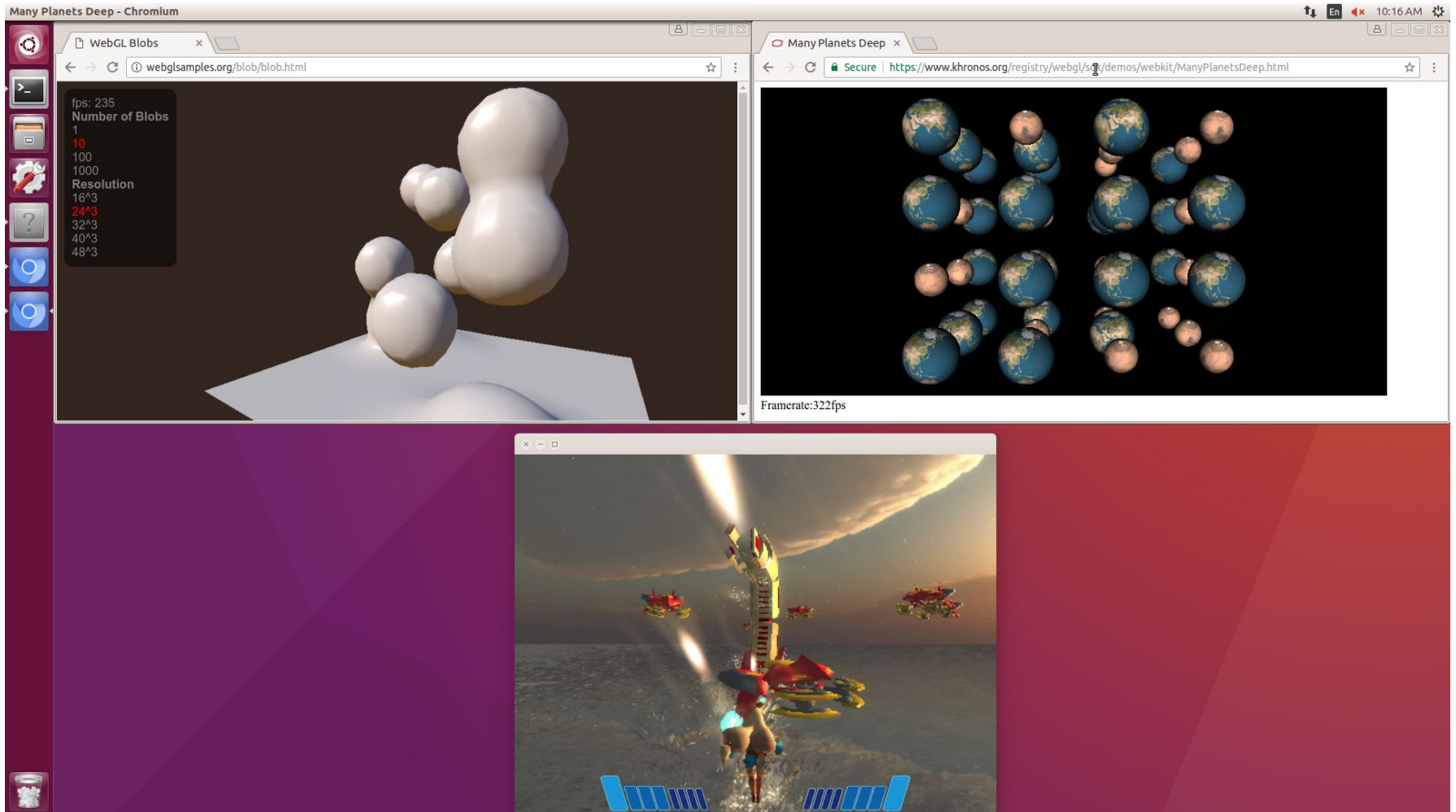
How we solved it



How we solved it



Sugar in practice!



What you would be potentially working on

There are several active projects in the group

- Help us build a new secure OS, called OctopOS
- Help us analyze existing system software to find vulnerabilities
- etc.

Summary

- Systems research is difficult but awesome
- If you like the challenge and you think you can do well at systems programming, send me an email!
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