

## **Victor Ruiz**

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**Education**            B.S. Mechanical Engineering, UC San Diego (2013)  
Southwest High School (2008)  
Wilson Junior High School (2004)  
Kennedy Middle School (2002)

**Tech Experience**    Center for Energy Research, UCSD – Mechanical Design  
Center for Advanced Cardiovascular Technology, UCI – Bioengineering  
Flow Control and Coordinated Robotics Lab, UCSD – Mechanical Design  
GE Aviation Systems, Tech Development – Test Engineering Intern  
Cymer Center for Control Systems and Dynamics, UCSD – Researcher  
Sikorsky Aircraft, Advanced Concepts – Engineering Analyst

### **Why Engineering?**

I chose to become an engineer because I wanted to use my creativity to design and build practical devices. My first engineering experience was with the FIRST Robotics Competition while I was a junior in the MESA program at Southwest High School. In the construction phase of the competition, I learned how to build a robot, learned how to operate standard shop tools, wrote my first computer program, and learned how to work collaboratively with others. During the actual competition, I was introduced to the art of engineering improvisation, where I had to make quick decisions on how to fix our team's robot after it received damage from competing. The second year that I participated in the MESA Robotics club, I learned how to manage a budget, how to maintain a schedule, and how to fundraise in addition to improving on the skills I had learned the year before. All of the skills and experience that I gained from the MESA Robotics club were directly applicable to my undergraduate coursework at UC San Diego.

### **What do I do as an engineer?**

I am currently an engineering analyst at Sikorsky Aircraft Corporation, an American helicopter manufacturer based in Stratford, Connecticut that is famous for designing and manufacturing the Black Hawk helicopter. I am a part of the Advanced Concepts group, which is responsible for designing new and innovative helicopters for Military and Civilian customers. The group primarily consists of analysts and designers. Analysts are responsible for the determining the performance parameters of the aircraft such as the engine type, max speed, cruise speed, lift to drag ratio, gross weight, fuel capacity, etc. As an analyst, the majority of my work consists of writing and modifying computer programs to solve systems of equations that model helicopter physics. I do lots of computer programming using VBA as well as create automatic calculation tools using Microsoft Excel. When I encounter a problem, I create a physical model of the situation using basic engineering physics and mathematics, and then I write a computer program to solve the model. After reviewing and checking my solution, I create a short summary presentation that illustrates what I did and what the solution tells us about the helicopter concept.

## **Projects I have worked on as an engineer:**

Developed a plasma generating machine to figure out how plasmas insulate themselves (i.e. keep themselves warm) to support research in fusion energy.

- Center for Energy Research, UC San Diego

Designed, built, and tested a biaxial mechanical loading device to figure out how bio-prosthetic heart valve tissue behaves when stretched so scientists can engineer stronger tissues that don't tear.

- Edwards Lifesciences Center for Advanced Cardiovascular Technology, UC Irvine

Built an innovative two link mobile robot prototype that can climb/swing/slide across taut cables (i.e. power lines) using 3D modeling software, 3D printing, and commercial electronics (microprocessors and sensors) in order to inspect the cables for damages.

- Flow Control and Coordinated Robotics Lab, UC San Diego

Analyzed, fixed, and built air powered turbine motors that are used to start large diesel engines, large turboshaft engines, and jet engines.

- GE Aviation Systems, Technology Development

Programmed control algorithms (computer code) to simulate energy distribution and management in collections of thermostatically controlled loads (machines that control heat like AC's, refrigerators, etc.) in order to figure out an optimum method for managing energy flow in a power grid.

- Cymer Center for Control Systems and Dynamics, UC San Diego

Designed and analyzed new helicopter concepts for the Army, Navy, and DARPA in order to create innovative methods of vertical flight.

- Sikorsky Aircraft Corporation, Sikorsky Innovations, Advanced Concepts