



California Science Center  
**CALIFORNIA STATE SCIENCE FAIR**  
**2001 PROJECT SUMMARY**

<b>Your Name</b> (List all student names if multiple authors.) <b>Jennifer S. Breger</b>	<b>Science Fair Use Only</b>
<b>Project Title</b> (Limit: 120 characters. Those beyond 120 will be ignored. See pg. 9) <b>Constructing a Wall-Hugging Robot</b>	<b>J1103</b>
<b>Preferred Category</b> (See page 5 for descriptions.) <b>1 - Applied Mechanics/ Structures &amp; Mechanisms/ Manufacturing</b>	<b>Division</b> <input checked="" type="checkbox"/> <b>Junior (6-8)</b> <input type="checkbox"/> <b>Senior (9-12)</b>
<b>Abstract</b> (Include Objective, Methods, Results, Conclusion. See samples on page 14.) Use no attachments. Only text inside these boxes will be used for category assignment or given to your judges.	
<p><b>Goal:</b> My goal was to design and program a robot that could navigate a maze.</p> <p><b>Materials and Methods:</b> The technique used was #wall-hugging# in which the robot goes straight when its side touch sensor is pressed and turns left when it is released. In the experiment, a series of robots was built and programmed using the LEGO MINDSTORMS ROBOTICS INVENTION SYSTEM 1.5 kit, which is currently being used in universities. I programmed my robots on my Micron PC using the LEGO MINDSTORMS software that includes its own programming language called RCX Code. I struggled to complete my main goal while encountering various problems. When I had trouble programming, I used my command blocks instead of sensor watchers which made the program more efficient. My command blocks are used to set up subroutines.</p> <p><b>Results:</b> I was able to reach my goal with limited success at the time of this writing, but thought of possibilities such as using one thinner wheel instead of two small thicker wheels in the back to reduce the amount of friction and enable the robot to successfully turn every inside corner.</p> <p><b>Discussion:</b> After performing my experiments, I concluded that there was not enough force from the robot's arm against the wall to allow it to turn inside corners. After doing my project, I better understood how mechanics, electronics, and programming are combined to make robots. I also learned how to build and program robots using the LEGO MINDSTORMS kit and found out that building robots, especially mobile robots, require a lot of patience, determination, and an engineering mind.</p>	
<b>Summary Statement</b> (In one sentence, state what your project is about.) My project was about constructing mobile robots.	
<b>Help Received in Doing Project</b> (e.g. Mother helped type report; Neighbor helped wire board; Used lab equipment at university X under the supervision of Dr. Y; Participant in NSF Young Scholars Program) See Display Regulation #8 on page 4. Online mentors helped with background information and pointed out useful websites; Computer teacher at school helped with programming problems	