

I have been teaching robotics for 8 years, and have only been able to send students home with their creations once. For this reason I have developed an inexpensive robotics platform that is simple to build and easy to program. Furthermore, it allows middle school students to work towards participating in Micromouse, a maze solving competition that is typically the province of upper level engineering students. I am currently building these robots with middle and high school students at Twindly Bridge Charter School, and they are doing well. Both of my proposals to teach students to build these robots at the Alaska Summer Research Academy camps this summer have been accepted.

By using an Arduino Nano and a solderless breadboard, I have been able to make the design as transparent as possible. Students wire each connection themselves and can see how everything works together. For this reason, they are able to take what they learn and easily apply it at home. One of my students mounted his Arduino on a broken remote control car. He also learned another programming language which he used to remotely control his robot using his computer's mouse pad. He was able to do this because he had access to the hardware and software to program his microcontroller at home. This project opens doors that other robotics platforms do not.

I would like to teach educators how to build these robots. For this reason I wrote a proposal to the Alaska Society for Teachers in Education (ASTE) and have contacted the organizer of the Anchorage School District's Summer Academy (ASDSA). My proposal for ASTE was not accepted because the organizers were concerned that not enough people would sign up early enough to gather funds and purchase the materials (it takes about a month to get everything shipped to Alaska at a reasonable rate). The president elect has since contacted me and asked whether I would like to try again next year. I fear that future attempts to offer this workshop in either of these venues will fail unless I am able to purchase materials ahead of time. This will allow me to minimize shipping costs and provide materials to participants who sign up at the last minute.

A thousand dollars would allow me to create a revolving fund whereby I could purchase enough materials to offer a workshop to at least ten participants. Since the robot is inexpensive (\$100), most educators would be able to pay for the materials, thereby allowing me to make this endeavor sustainable indefinitely. My goal for the next year is to offer a workshop to 10 teachers at the ASDSA and another 10 teachers at ASTE. Thereafter, I will continue using the funds to offer other workshops as opportunities present themselves.

I have put countless hours into designing this robot, and have spent even more time developing a series of video tutorials. Although I am not quite finished, my students are already using the videos and I have made many changes and improvements based upon their feedback. To get a better idea of what this project looks like, please visit my free online course at: <http://www.udemy.com/nanomouse>.

I know your intention was to spend funds directly on students; however, I am certain that by funding this proposal you will indirectly benefit a far greater number. The majority of our STEM educators use LEGO robotics with their students. These kits are great, but they are prohibitively expensive in the sense that many students will never be able to afford their own. This project focuses on teaching students to use more powerful technology in sophisticated ways, and enables them to apply what they learn at school to projects of their own choosing because the materials are affordable.

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