

Public Invention Fourth Quarterly Report, 2019

-- Robert L. Read, 12/3/2019

This is the fourth quarterly report of Public Invention, whose first official meeting was February 15, 2019.

Organization Actions

The President accepted the resignation from the board of Kaitlin Devine. A board meeting in Austin will be held Dec. 7th.

Public Invention

Just as last quarter, Rob and David have continued working collaboratively to build a handwriting-enabled mathematical assistant [Math Tablet](#). Significant progress is being made; at the board meeting further plans for the project will be made.

Rob completed the "[Segmented Helix](#)" project including a browser-enabled [interactive 3D demo](#) which grew out of the 2018 Mathathon and paper. This work is ready for submission to ArXiv as a preprint and we will then seek academic conference to submit it to in either math or mechanical engineering.

["Rapid E. coli detection"](#) project lost its volunteer, unfortunately.

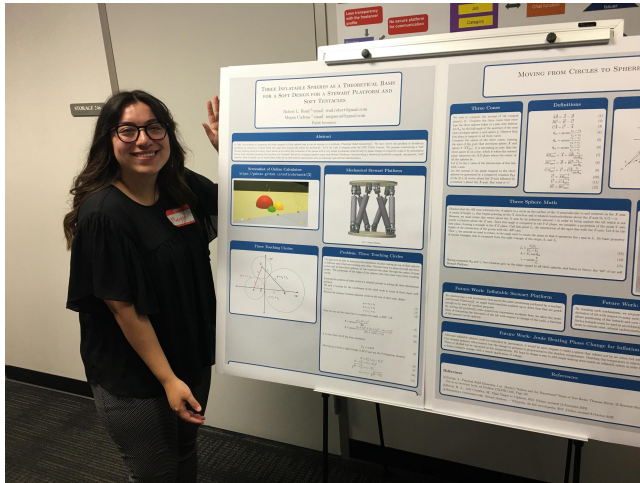
Eric Goff and Rob continue to work on the "Number Spectra" project but have put little time into it and have not made much progress.

Outreach and Communication Efforts

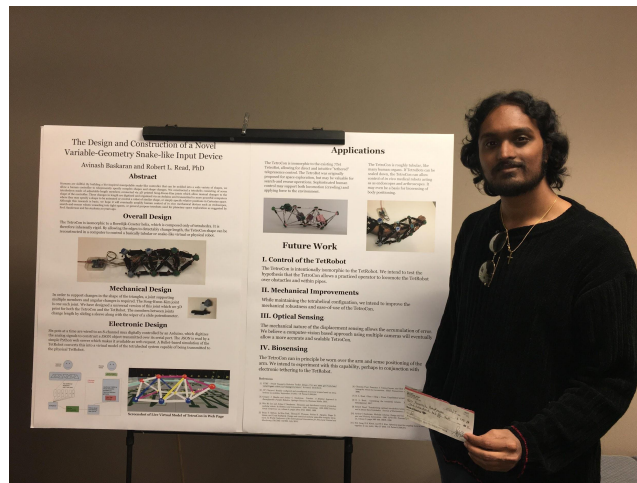
Rob chose Trisummit Solutions as a replacement web design firm and has begun design conversations with them.

Rob traveled with two volunteers who happen to be undergrads at the University of Texas to the campus of the University of Houston (Clear Lake) where the IEEE was hosting a forum on professional skills and had a poster session. There were 11 participants, including Megan

Cadena and Avinash Baskaran, pictured below. Megan presented some math on a theoretical approach to build a "soft robotics" Stewart Platform. This math is implemented in an interactive online calculator you can play with here: <https://pubinv.github.io/softrobotmath/>.



Avinash and Rob finished the 7-tet controller begun by Joshua Hannon and Evan Bartilson some years ago; it is now working. Avinash got the highest score and won one of the three \$100 prizes. Avinash and Rob hope to rebuild the Tetrobot with metal parts Rob has had 3D printed and our new universal jointing system which should make repair easier; this should open up some pretty big capabilities that did not exist before. We hope to submit a paper on this subject before Avinash completes his application to graduate schools in robotics, possibly to [Robotics: Science and Systems](#).



It was a great experience; we made a lot of good contacts that I hope will turn into volunteering or invention coaching relationships, including Dr. Sabia Abidi of the Rice University Bioengineering department.

Rob and Marc jointly submitted a “session” to LibrePlanet 2020. This are large conference which will give us some exposure. Rob and Marc have already written the complete slides for the talk, based on work instigated by Stephanie to produce a lightning talk.

Finally, Rob continues to lead part of his local Engineers Without Borders Chapter, and attended its National conference and serves as a Texas State Representative. This is a rich source of contacts. Rob is assisting an engineer working with the ASTM developing a standard for Earthen Floors.

Status of Previous (Old) Goals

- Organize the Invention Projects into a map and other forms that make them easier to understand. *Partially accomplished by the work that Stephanie and Rob did on the “short list”.*
- Identify and promote the top 3 projects (probably Rapid E. Coli detection, the Tetrobot, and the Segmented Helix project.) *Partially accomplished.*
- Complete the Segmented Helices Project to the level of ready-for-publication - **Done**
- Plan a Public Invention event in conjunction with some other organization. **Partial--Rob and Marc submitted to LibrePlanet.**
- Improve our web presence, perhaps by hiring a web designer - *Partial: much documentation gathered, but changed web designers.*

Status of Last Quarter’s Goals

- Produce a 5-minute “lightning talk” and a repository of “slides” - **done**
- Complete the Segmented Helices Project to the level of ready-for-publication - **done**
- Build a functional hand-held “gluss controller” puppet that controls the main tetrobot to the level of an impressive demo and video - **done**
- Make significant progress understanding basic issues on the rapid E. coli detection project. -- **failed**
- Make sure our volunteer students have a fun, educational, and productive summer **done**
- Progress Math Tablet to the point of being able to announce and possibly attract new recruits - *progress, probably needs one more quarter*
- Identify and promote the top projects with a coherent strategy - **done**
- Plan a Public Invention event in conjunction with some other organization. - **failed**
- Develop a fundraising strategy -**failed**
- Build a better website and web presence - *progress, but a setback*
- Establish a “shop” for selling swag and merchandise - **failed**
- Create more recruiting efforts
- Continue working on Number Spectra project - *progress*

Goals for Coming Quarters

- Hold a successful workshop/retreat
- Build a functional hand-held “gluss controller” puppet that controls the main tetrobot to the level of an impressive demo and video. Part of this goal is to have a paper/publication/website which can assist Avinash in applying to graduate school.
- Make significant progress understanding basic issues on the rapid E. coli detection project.
- Progress Math Tablet to the point of being able to announce and possibly attract new recruits
- Plan a Public Invention event in conjunction with some other organization.
- Develop a fundraising strategy
- Significantly begin a carbon-reduction project, possibly an internal combustion wood-burning stove

Financials

On Dec. 3rd, we have approximately \$2400 due to receiving an additional \$5,000 gift from Robert L. Read (Rob.) We have thus spent ~\$76000. Most of this has been spent on equipment for the projects the summer students are working on, especially 3D printed parts for the robot. This summer, we have been spending a lot of money on 3D printed parts for the GlussCon project, with a local company that provides rapid turnaround for prototyping. Detailed access to our books available upon request.

Closing Thoughts

Given that there are now 5 active projects underway, two additional Invention Coaches, and two summer students, we seem to have developed some definite momentum.

- Segmented Helix (almost done)
- Math Tablet (coached by David Jeschke)
- GlussCon (volunteer is Avinash Baskaran)
- NumberSpectra (coached by Eric Goff)
- SoftRobotMath (volunteer is Megan Cadena)
- Rapid E. coli (orphaned at present)

We remain largely unknown; our outreach efforts, in the form of writing, produce steady but very low numbers of impressions. Stephanie and I believe that more public speaking needs to be a major goal. We worked with a website designer but need to find a new one.

I would like to emphasize environmental projects in the future; I have to fight against the tendency to do math and computer science-related projects. Nonetheless, our two other Invention Coaches are working on software-only projects, and I do not think we should turn any such project away.