

Public Invention Third Quarterly Report, 2019

-- Robert L. Read, 10/4/2019

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

Organization Actions

There were no organizational actions this quarter. A board meeting in Austin will be held Dec. 7th.

Public Invention

We worked with a web designer in the production of a new website. We need to hire a new designer to complete this work.

Rob and David have been working collaboratively to build a handwriting-enabled mathematical assistant [Math Tablet](#). Significant progress has been made. Rob has spent 6 hours a week on this project (or more) as promised. We have not deemed it ready for much official promotion, though we hope to reach that point in a few months. Significant progress has been made integrating Mathematica into this project. I estimate we can announce it by January.

Sadly, David's family had a tragic event at the end of this quarter. However, David plans to continue this work.

Avinash Baskaran, a student at UT, has taken on a summer project to work on the [Gluss Controller](#) project. Our hope is to have an academic paper for Avinash by Dec. 1 (in timer for him to apply to graduate school), or at least a good "poster session". Rob and Avinash have been meeting weekly. A spin-off our 3D modeling work is a tiny repo for OpenSCAD modeling: <https://github.com/PubInv/SCAD-fillet-tools>. At the time of this writing, we created a working 2-tet prototype. We are building this out to a complete 7-tet controller. We then integrate it with the existing 7-tet robot. The new design has two major improvements:

- The "sleeves" are now basically "test-to-fit", which means that when a solder connection fails or a wire breaks, it is very easy to replace the pot. The holders are also treat the wire more gently.
- We created a "universal" joint system, which we hope to use on the main robot itself. That is, we have can now use exactly the same parts (but at different scales) for both the robot and the controller.

Rob has put a major effort into the “[Segmented Helix](#)” project including a browser-enabled [interactive 3D demo](#) which grew out of the 2018 Mathathon. We estimate this will produce a high-quality conference or low-level journal paper within another month. The applied math being worked out is publishably original and closely related to the Tetrobot project, which we hope to return to when write-up of this project is complete. A highlight of this work is the enumeration of a complete “zoo” of platonic helices.

Shreya Bhatia joined the “[Rapid E. coli detection](#)” project as a summer volunteer. A cheap digital microscope was purchased for this project which was being carried out by Rob as part of his volunteering with Engineers Without Borders. Much was learned on this project. Unfortunately, Shreya has ceased working on the project. This project is now orphaned and needs another volunteer.

On the number spectra project, after some uninteresting results, Eric came up with the idea of using continued fractions for this, and has continued the work. Rob implemented a graphical numberline. We plan to continue this work, including by separating out the numberline functionality.

Outreach and Communication Efforts

Adam suggested, and we have now committed to, a one-day workshop on Dec. 7th. I am excited to say that ALL board members will be there. The agenda of this workshop is underway.

Rob and Marc plan to jointly submit a “session” to LibrePlanet 2020 and possibly FOSSDEM. These are large conferences 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.

We have engaged a web designer to improve our branding, design and web presence. Unfortunately we have had to terminate our work with her, although some valuable website design ideas were developed.

Stephanie and Rob produced a “short list” of six projects for us to emphasize out of our many projects. We also intended to meet with Hacker Dojo in San Francisco, and present a “lightning” talk; sadly, Rob had to have urgent surgery which cancelled his trip to San Francisco. We will look for a chance to do this in the future.

A branding exercise was held which helped solidify our vision, and led to engaging a web designer. This relationship did not work out. Nina has volunteered to work with our new designer on this.

The essays "[The Joy of Collaboration](#)" and "How to Graduate from [Maker into Public Inventor](#)" were published in Hackernoon, obtaining 213 and 107 views, respectively. In general we get 800 views a month (some of these are essays which are not related to Public Invention.)

Early in the quarter, the "Triad Balance" project was published as a [package](#) installable via the Node Package Manager (NPM). Last week it received one download per week. The essay "[A UX Widget for Expressing Balance](#)" was published in "UX design collective".

Rob and Avinash Baskaran created a [repo](#) to contribute some code for OpenSCAD to do rounding of basic shapes, something needed by the community.

Rob created a [5-minute lightning talk](#). This was not delivered because of the shoulder surgery.

Finally, Rob continues to lead part of his local Engineers Without Borders Chapter, and is active in the regional organization. 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 - **90% complete, or more.**
- Plan a Public Invention event in conjunction with some other organization. **LibrePlanet will likely be the first such**
- Improve our web presence, perhaps by hiring a web designer - *We worked on this, but must reinvigorate our efforts.*

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
- Build a functional hand-held "gluss controller" puppet that controls the main tetrobot to the level of an impressive demo and video - **progress**
- Make significant progress understanding basic issues on the rapid E. coli detection project. -- **progress (but harder than we thought)**
- Make sure our summer 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

Financials

On October 3rd, we have approximately \$2000 in our checking account from our original \$5,000 gift from Rob. We have thus spent ~\$3000. Most of this has been spent on equipment for the projects the summer students are working on. 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

On June 23rd, Rob was hit by a car on his bicycle, injuring his shoulder. This required surgery a month later. The injury and surgery rendered Rob’s left arm temporarily useless and required a long and painful recovery. This may have impacted our accomplishments this quarter.

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.

I was hit by a car on my bicycle and severely injured my shoulder requiring repair of the rotator cuff; this has hampered my effectiveness, but I expect to be mostly back to normal in a few more weeks.

The segmented helix project has taken an enormous amount of time, but produces some extraordinary results. This project grew out of the Public Invention Mathathon of 2018, which will be mentioned in the paper. I hope to have this paper ready for publication by the end of July. This is an example of dilemmas which we will constantly face: whether to invest in “follow through” and serious publication, or to invest in recruiting, outreach and developing new projects. I personally believe we need to distinguish ourselves from other organizations by emphasizing “follow through” and real results. As painful as it has been to spend months on the segmented helix project, I remain convinced it was the right thing to do.