

Rat Pack Meeting Minutes
9/5/18, 3:30

Location : JML 71B

People Present

Team Advisor: Dev Shrestha
Shop Mentor: Jake Miller
Colin Burkhalter
Mitchell Williams
Stephen Schoonen
Stuart Sater

Subject Matter

- Document Sharing
 - Share drive vs one drive
- Project Planning
- Semester Goals
- 1st Snapshot
- Client Meeting
 - PE BE student lounge, 9/10
- Team Contract

Action Items

- **All:** Prepare questions for the client meeting

Rat Pack Meeting Minutes, Client Meeting
9/10/18, 3:00 PM

Location : Physics and Engineering Building, Student Lounge

People Present

Client: Nathen Shiele
Shop Mentor: Jake Miller
Colin Burkhalter
Mitchell Angelo
Stephen Schoonen
Stuart Sater

Subject Matter

Client Questions

1. What is the desired size of the entire device? (Understanding is that it must fit in the rat incubator of unknown size)
2. Is the size for the belt size firm at 12cm x 20cm? If not, what is the maximum/minimum sizes the belt could be at to still be acceptable.
3. Will the treadmill be moved around a lot or will it have a dedicated space? (Battery operated or wall plugin(preferred))
4. If the treadmill is computer controlled, will there be a dedicated laptop/computer? Or should it be able to easily run on any computer (more difficult)

Rats

5. What are the approximate measurements (size and weight) of the rats
6. Are we building the apparatus to hold the rat as well?
7. What length are the rat's legs as they grow/ does the support bar need to be adjustable, if so, by how much?
8. Do we need side cameras as well as a bottom up camera? How many cameras? What kind of cameras? (dimensions, mounting). If so would they need to be controlled by the same program as the belt apparatus?

Safety/Cleaning

9. Does the treadmill need to be enclosed for the safety of the rats?
10. What other specific safety features other than the stop button?
11. Questions regarding to material selection for apparatus and belt: necessary weight, waterproofing, tear resistant, thickness etc.
12. Will the treadmill get very dirty while in use? Should it be easy to clean?
13. Is soundproofing an issue with the tests running on newborn rats?
14. Are there any materials (other than materials known to be toxic) that should be avoided?

Performance

15. How do you want the speed/angle control to function? Insert an exact value? Dial/slider controlled? Simultaneous control of speed/angle?

16. Will speed/angle changes need to be made while the device is running?
17. How many hours will the treadmill run in an average week? How long will it run continuously?
18. It was mentioned that the previous version was fragile, other than the computer issues, what part of the device was weak? ("Maybe" question, not that important)
19. If the treadmill breaks or malfunctions, will there be somebody available to make simple fixes? (i.e. loose screws, belt loose, etc).
20. Is it important for the product to be made with easily available, replaceable components?
21. Are there any features on the treadmill you would like to see added to improve quality of life?

Project Management/Misc

22. Do you have your own timeline for construction of product for internal testing? Proof of concept prototype?
23. Is there an internal budget schematic you'd like us to follow, i.e. \$400 for parts, \$300 for etc. or is it as we see fit.
24. What does this project look like in cooperation with the department in ISU? Any needed trips or communication?
25. Are there plans for more replicas of our treadmill to be made in the future?

Action Items

- **All:** Review updated client requirements

Rat Pack Meeting Minutes
9/13/18

Location: Gauss-Johnson Engineering Building, Design Suite

People Present

Team Advisor: Dev Shrestha
Shop Mentor: Jake Miller
Colin Burkhalter
Mitchell Angelo
Stephen Schoonen
Stuart Sater

Subject Matter

- First Snapshot day
- Shop time
- Client Interview
- Budget Overview
- Possible open source software options

Action Items

- **Colin:** Create a Gantt Chart for tracking project progress.
- **Mitchell:** Contact Debbie in the BE department to establish the best system for making purchases. Send the preliminary budget to Dr. Schiele.
- **Stephen:** Deliver a summary of project requirements, as we understand them, to Dr. Schiele.
- **Stuart:** Create a meeting minutes template and complete it for today's meeting.
- **All:** Come prepared with design concept ideas

Rat Pack Meeting Minutes
9/20/18

Location: Gauss-Johnson Engineering Building, Design Suite

People Present

Shop Mentor: Jake Miller
Colin Burkhalter
Mitchell Angelo
Stephen Schoonen
Stuart Sater

Subject Matter

- Dev will be gone for the next couple weeks
- Design and brainstorming ideas for apparatus
 - Screen
 - Stepper motor vs DC motor
 - PCB
 - Screen Interface
 - Breadboard for preliminary design, PCB for final
 - Capstone session and eagle will help us to create PCB
- Create and approve timeline for forward progress towards Snapshot 1 (due Oct 4th)
 - Gantt chart, Visio
- Budget procedures
 - Budget is reduced, not externally funded so less overhead (\$719)
 - Use Dr. Schiele for anticipated purchases, for emergency purchases, get reimbursements through Debbie
- Discuss Wiki page briefly
 - First deadline (Nov. 1st) requires basic outline, problem description, intro
 - Wikimaster

- Review Project Requirements and send them on
 - Requirements should be put into measurable (quantifiable) metrics
 - Pair with excel sheet
- OneDrive
 - Continue with OneDrive, may use shared drive for solid works file

Action Items

- **Colin:** Create agenda for next week and continue working on Gantt chart and timeline
- **Mitchell:** P-card training
- **Stephen:** Refine project requirements and pair with excel sheet containing first column of design metrics (due Nov. 27th)
- **Stuart:** Look into simultaneous editing on one drive, backfill meeting minutes for first meeting and client meeting, wikimaster training
- **All:** research other similar systems to have justification for future design decisions

Rat Pack Meeting Minutes
9/27/18, 3:30 PM

Location: Gauss-Johnson Engineering Building, Design Suite

People Present

Shop Mentor: Jake Miller
Colin Burkhalter
Mitchell Angelo
Stephen Schoonen
Stuart Sater

Subject Matter

- Product Requirement Document
 - Waiting for response
- One-drive editing and access
 - Link sent to Colin
- Client Response
 - Shiele office hours
- Design ideas and research discussion
 - Most use stepper motor with no gear box
 - With gear box, motor may be moving too slow
 - Can use belt drive
 - Motor controllers
 - Don't use easy driver, overheating common.
 - IEEE overflow store, basement of Gauss Johnson
 - Servo motor
 - Easier to program
 - Powerful enough?
 - Maximum weight of rat?
 - Transparent PVC vinyl tarp
 - Stiff, will require tensioning
 - Other commercial designs
 - Had large speed ranges
 - Transparent cutout sides
 - multilane
- Snapshot requirement discussion
 - Gantt
 - Project requirements
 - Budget
 - Design research
 - Picture of previous design?
- Expectations for timeline submission
 - Pick through expo for Gantt chart
 - Prototype, design improvements etc.
- Logbook

- Logbook review form
- P card
 - can't be used by students

Action Items

- **Colin:** Work on timeline/ Gantt
- **Mitchell:** Help with Gantt chart
- **Stephen:** Request a picture of the previous treadmill and maximum weight of rat
- **Stuart:** Backfill first meeting, look into portfolio
- **All:** Continue Design Research

Rat Pack Meeting Minutes
10/04/18, 3:30 PM

Location: Gauss-Johnson Engineering Building, Design Suite

People Present

Shop Mentor: Jake Miller
Colin Burkhalter
Mitchell Angelo
Stephen Schoonen
Stuart Sater

Subject Matter

- Logbook Review
- Research Idea follow-up
- Client Response
 - Enclosure size – 1000x 900x 500 mL
 - Materials- no materials off limits
 - Max Noise – 60 dB, less preferred
- Snapshot 1
 - Contents
 - Descriptive title
 - Team name, members, and sponsors
 - Objective statement
 - Project requirements table
 - Value proposition
 - Documentation of project learning
 - Concept development
 - Plan with schedule/ milestones
 - Budget
 -
 - Portfolio
 - Logbooks
 - Other deliverables
 - Pros and cons of dc vs stepper
- New research and ideas
 - NIML CSF pump tour next meeting
- Timeline Review
 - Longer troubleshooting period
- Discuss next deadline item

Action Items

➤ Colin:

- Update timeline with longer troubleshooting period, start construction earlier
 - Majority of construction done by feb.
- Team name letters

➤ Mitchell:

- DC vs Stepper motor comparison for project learning

➤ Stephen:

- Get pics of old model for snapshot
- Mission Statement

➤ Stuart:

- Minutes
- Belt material (Vinyl) for project learning
- Descriptive title of project statement (1-2 sentence)

➤ All:

- **Share Drive Snapshot upload (by next meeting mon @3:30)**
- Continue researching Design ideas

Rat Pack Meeting Minutes
10/11/18, 3:30 PM

Location: Gauss-Johnson Engineering Building, Design Suite

People Present

Dev Shrethsa

Shop Mentor: Jake Miller

Colin Burkhalter

Mitchell Angelo

Stephen Schoonen

Stuart Sater

Subject Matter

- Snapshot discussion
 - Many faculty recommend dc with
 - 300 rpm minimum
 - Gear box may be required
 - Ramp with screw actuator
 - High rpm, more efficient
 - Belt
 - Belt with no seam
 - belt
 - Screen
 - Arduino- simple dial interface, hardware driven
 - Rasp pi- touch screen, software driven
 - Emergency stop, system that reverses polarity, or short leads. Faster than software
 - Resistor to limit stopping speed.
 - Gear ratio may stop
- Logbook
 - Show calculation/ more engineering in log books
- Breaking the build into sections
 - Code/ control/ PCB- Mitch/ Stephen
 - Belt/ tensioning - Colin
 - Enclosure – Stephen/ Colin
 - Hardware- Stephen/Mitch
 - Frame- Stuart/ Colin
- Present multiple ideas for client design meeting (11/16) design review

Action Items

- **Colin:**
 - **Belt set up and tensioning set up with sizes/ pricing**
 - **Improve timeline**
- **Mitchell:**
 - Motors controllers and encoders: types, sizing, pricing
- **Stephen:**
 - Motors controllers and encoders: types, sizing, pricing
- **Stuart:** wiki workshop on mindworks
 - rotary actuator, sizing, prices, motor types
- **ALL:** record all your research digitally to put in project learning (examples on mindworks)

Rat Pack Meeting Minutes
10/18/18, 3:30 PM

Location: Gauss-Johnson Engineering Building, Design Suite

People Present

Dev Shrethsa
Colin Burkhalter
Mitchell Angelo
Stephen Schoonen
Stuart Sater

Subject Matter

- Motor research
 - All motors have enough torque
 - Found a dc with encoder and gearing built in for \$30
 - Metal gears (43.8:1 or 50:1)
 - Brush or brushless? Most likely brushless
 - Consider wattage for power supply
 - Stepper
 - 17, smallest possible motor size
 - HYBRID
 - \$40 OR \$25 FOR 1.8
 - Min price \$60 including controller
 - High heat at slow speeds
- Linear actuator
 - 4 inch stroke length
 - Force is minimum 15 lbs
 - \$140 per actuator
 - Feedback encoded
 - Potentiometer
 - Complexity will be considered when we have design interview with client (11/16)
- Arduino
 - Rasp. Pi most likely overkill
 - DUE and mega are major considerations
 - Additional pins
 - Difference is clock speed (due is 4x mega) and number of usb ports
 - Consider voltage
 - Both cost about \$30
 - Justify decision for chosen Arduino
- Interface

- Touchscreen \$27
 - Easily display, menus, gui,
 - Time consuming to program
- Small lcd with buttons (\$7 for screen) need buttons too.
 - Simple to use and program
 - More Arduino pins required
 - Number keypad likely required
- Another option to propose to client (by 11/16)

Action Items

- **Colin:** create solid works mock up for linear actuator mechanism
 - Research smaller linear actuators
 - Hand drawn design scheme
- **Mitchell:**
 - Call company to verify brush/brushless
 - Look into wattage for considering power supply
- **Stephen:** fill out project learning sheet
 - One page of important things you learned and why it is important for our project
- **Stuart:**
 - wiki workshop on Tuesday
 - “ Variable speed treadmill for studying neo-natal rats”
 - ankitg@uidaho.edu, send name, email, blip to get access wkimaster computers
 - 4:00 gauss 115 tuesday
 - Create mockup of manual inclination
 - Hand drawn design scheme
 - Parts list folder with sub folders containing sub filters.
- **ALL: PARTY HARD, be safe**

Rat Pack Meeting Minutes
10/25/18, 3:30 PM

Location: Gauss-Johnson Engineering Building, Design Suite

People Present

Dev Shrethsa
Colin Burkhalter
Jacob Miller
Mitchell Angelo
Stephen Schoonen
Stuart Sater

Subject Matter

- Dev has motor example in his office (JML)
- Motor Mitch was looking into was brushed
 - High wattage
 - Look at similar smaller brushless motor
- Touch vs buttons
 - Touch needs 8 pins, LCD screen needs 8 pins itself + buttons
 - More difficult to program
 - Both can be made equally user friendly
 - Touch screen shield for mega
 - Both options will be presented to client
- Uno Arduino won't be sufficient
 - Mega (\$21) or due (\$50) are options
- Wiki
 - Wiki help is less useful than copying
- 3D
- Tensioning device
 - Clamshell gear (dirt bike)
- What to present for design review
- 3 incline options to present to client
 - Actuator reacts to turning off?
-

Action Items

- **Colin: Doodle poll set up**
 - **Try to get a sample of prefab belts**

- **Manual incline mechanism**
 - **Mitchell: Make a comparison of screen options for design reviews**
 - **Stephen: Give Schiele options for design review times 11/5, 11/7, 11/9 (after doodle poll)**
 - Look into bumper assembly (clip on bracket, slots) run wild
 - **Stuart:**
 - **Solid works model of manual Incline. Look into sample of clear belt material.**
- Clear design plan for how pvc belt would be created.**
- Post wiki link**
- **ALL:**

Rat Pack Meeting Minutes
11/1/2018, 3:30 PM

Location: Gauss-Johnson Engineering Building, Design Suite

People Present

Colin Burkhalter
Jacob Miller
Mitchell Angelo
Stephen Schoonen
Stuart Sater

Subject Matter

- Belt Sample
 - Vinyl on the way
- Belt design
 - Premade clear belts available in pre-determined sizes
 - Food processing
 - Vinyl Heat weld vs adhesive will be tested when samples arrive
- Wikipage update
 - Add content
- Incline design
- Interface design
 - Touch screen resolution
- Wall clips
 - Notch or slot connection
 - Hitch pin (cotter pin)
 - Square notch with release lever
 - C-clamps with pins
 - Box less preferred to removable walls
 - Compliant mechanism

Action Items

➤ **Colin:**

- **Continue with getting a sample of prefab belts**
- **Manual incline mechanism**

➤ **Mitchell:**

- **IR switch**

➤ **Stephen:**

- **Finish value proposition**
- **Ask Schiele about mon Nov. 12th (2:30)**

➤ **Stuart:**

- **Add content to wikipage and submit**
- **Continue belt design work**
- **Ideas for incline improvement**

➤ **ALL:**

- **portfolio due Nov 8th**
 - **see the portfolio outline for any content that could be added**
- **Logbooks due on Nov 8th**
- **Bio and pic in one-drive**

Rat Pack Meeting Minutes
11/8/2018, 3:30 PM

Location: Gauss-Johnson Engineering Building, Design Suite

People Present

Dev Shrestha
Colin Burkhalter
Mitchell Angelo
Stephen Schoonen
Stuart Sater

Subject Matter

- Spoke with companies about prefab belts
 - Pre-made belts do not come in the size we need
 - 20cm pretty small compared to what is available
 - Opaque not clear
 - Could make one from materials found out of Europe
- Possible methods for connecting belt
 - Lacing device
 - \$60
 - More research required
- Incline mechanism
 - Manual wheel
 - Friction for holding torque
- UI
 - Touch screen needs 32-40 pins not 8
 - 7" \$60 or 5" \$35
 - Menus are easy to make
 - Capacitive vs resistive touch screens 5" only has resistive, 7" has both
 - 5" minimum
- Value proposition
- Design Review, Mon 12th at 2:30 PM in BE faculty conference room in PE
 - Bring costs into discussions
 - Excite client with improvements
 - Animations
 - Record presentation for Dr. Brumley
- BE dept has laser and plasma cutter

Action Items

- **Colin:** investigate lacing technique
- **Mitchell:** Scale touch screen

- **Stephen:**
- **Stuart:**
- **ALL:** Prepare for design review
 - **Wiki bio**
 - **PRACTICE PRESENTATION AT 1:30 IN EP 4TH FLOOR STUDENT (earlier if you can)**
 - **Button shirt, no jeans**

Rat Pack Meeting Minutes
11/15/2018, 3:30 PM

Location: Gauss-Johnson Engineering Building, Design Suite

People Present

Dev Shrestha
Colin Burkhalter
Mitchell Angelo
Stephen Schoonen
Stuart Sater

Subject Matter

- Design Overview
 - Budget, add poster and parts
 - Choose dc motor Large touch screen
 - Simple manual incline
 - Belt
 - Flush connection
 - 20 gauge
 - Other option could be nice
- Need to start picking parts
 - Rollers
 - Power supply
 - 12V motor, 5V PSU
 - PC psu cheaper but may be bulky
 - Need motor controller
 - Varies voltage to DC motor
 - Arduino mega
 - 7-inch screen

- Complete 3D model
- Overall cad model done by 12/07
- 11/29 whiteboard sketch of design

Action Items

- **Colin:** belt lacing techniques
- **Mitchell:** Screen, breadboard, and wires in parts list
- **Stephen:** Motor, Arduino in parts list
- **Stuart:**
 - Belt in parts list, one of each
 - Wikipage completion up to and including project learning and send link to Dev
 - Dimension spreadsheet
- **ALL:**
 - Personal bio and pics to one drive
 - Citizenship due 11/15/18

Rat Pack Meeting Minutes
11/29/2018, 3:30 PM

Location: Gauss-Johnson Engineering Building, Design Suite

People Present

Dev Shrestha
Jacob Miller
Colin Burkhalter
Mitchell Angelo
Stephen Schoonen
Stuart Sater

Subject Matter

- Software
 - Prioritize getting electronics to tinker with code
- Purchasing
 - Tax exempt preferred but not necessary
 - Schiele can do purchasing
- Screen
 - Capacitance vs resistance
- Snapshot
 - Picture and a couple bullets about the product

Action Items

- **Colin:**
 - **Tensioner**
- **Mitchell:**
 - **Change colors on overall design model**
 - **Screen**
- **Stephen:**
 - **Reminder to Schiele about snapshot**

- **Motor**
- **Stuart:**
 - **Belt**
- **ALL:**

Rat Pack Meeting Minutes
12/6/2018, 3:30 PM

Location: Gauss-Johnson Engineering Building, Design Suite

People Present

Dev Shrestha
Jacob Miller
Colin Burkhalter
Mitchell Angelo
Stephen Schoonen
Stuart Sater

Subject Matter

Snapshot Discussion

Parts Ordered for break