

SURG238: PRACTICAL INTRODUCTION TO CLINICAL RESEARCH

Welcome to Week 1!

Teaching team



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Visit our CAP profiles to learn more about our research interests!

1-slide logistics

Why take the course?

Nuts & bolts of taking a study from conception to publication
efficiently

Who should take this course?

ALL levels (new & experienced researchers)

Requirements?

Full attention during 1-hour class (no real homework)

Med scholars grant & 3-min presentation (if Surgery Scholarly concentration)

*Jan 26th: pick a project

The “one message” for today: productivity

Q1: How much time do you think you waste a day?

Q2: How long can you stay “on task”?

Medical school is busy...but you will only get busier. To become an academic physician, you have to master productivity.

Takeaway #1: activity is NOT productivity

Resume 1

“A” Lab

- Assisted x team investigate question y
- Demonstrated strong work ethic and resilience...
- Mastered organization skills, coordinating...

“B” Lab

- Investigated question z
- Over 500 hours doing...
- Successfully tested y hypothesis using a novel technique

Resume 2

Publications

..., Smith J, ..., Journal of Y. 2020 Jun 19

*Jane Smith, ..., ..., ..., ... Clinical Journal of X. 2019
May 8*

Resume 1 is inadequate for residency applications + life moving forward.

What's the currency of academic medicine?



Publications. Presentations. Publications.

Takeaway #1: activity is NOT productivity

Every research project should result in a peer-reviewed publication (\pm conference presentation).

Do NOT start projects that you can't finish.

*If new to clinical research, start with ONE project.

If you start a project, finish it within a reasonable timeline.

*e.g. med scholars project: generally, < 1 year

Takeaway #2: Develop productive habits that stick. Start today

Do not multi-task. Stay focused

- text/email notifications off while working
- Short bursts of focus. Break

Forget to-do lists

- Focus on the One Thing per day

Start and end your day the right way

- Not with emails, social media

Takeaway #2: Develop productive habits that stick. Start today

Research tends to fall off the priority list when busy (clinical rotations, residency)

- It's not about time management. It's priority management.
- Block off “dedicated research time” (e.g. 6-6:30AM MWF)
- Commit to your schedule (self-defined internal deadlines)

The usual way to conduct research

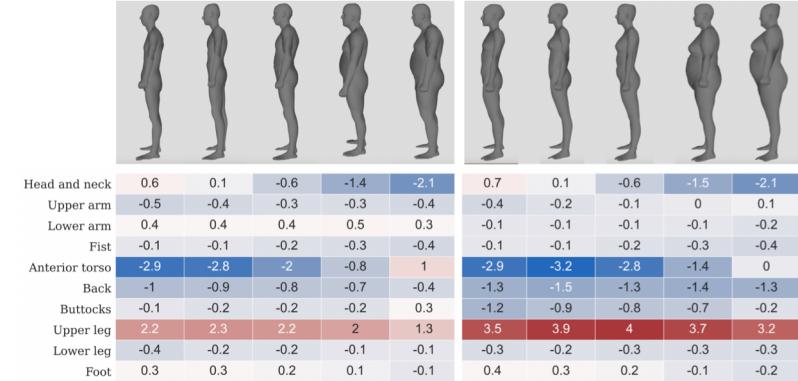
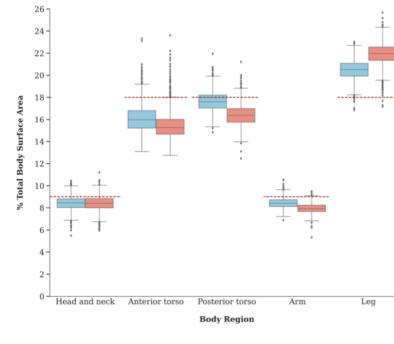
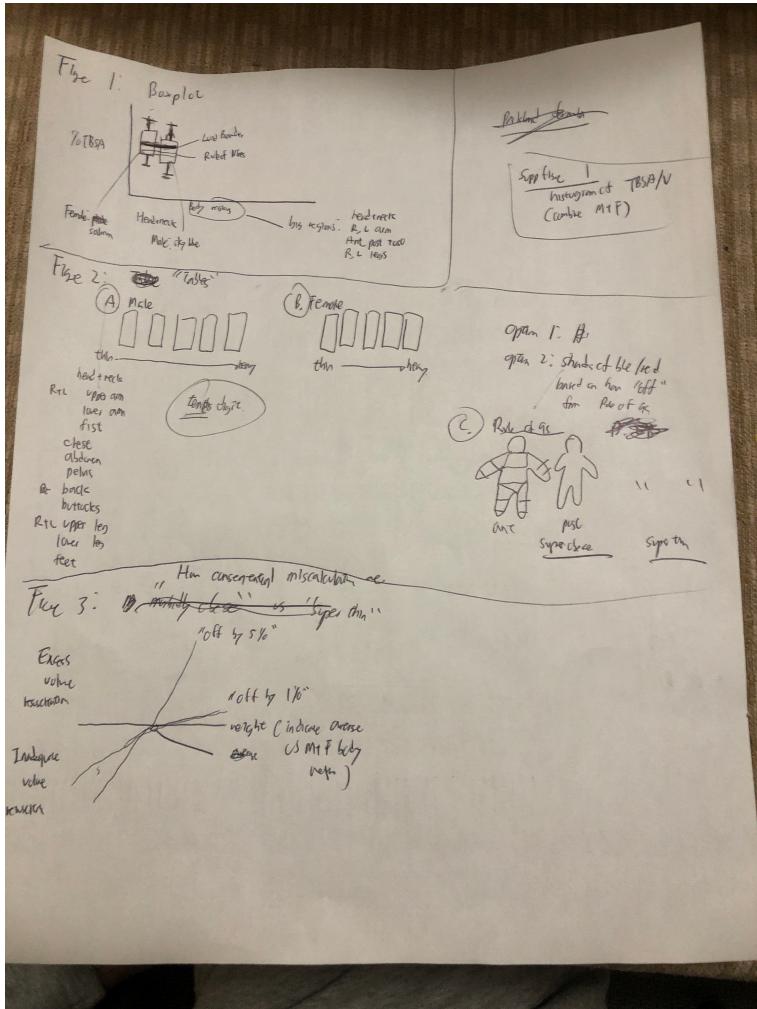
- Come up with research idea
- Define research question
- Write IRB
- Wait for IRB approval
- Get data access
- Define analytic method
- Analyze
- Review results
- Write manuscript: intro, methods, results, discussion, conclusion
- Identify goal journal
- Submit
- Respond to reviewers
- Accepted

This is extremely inefficient. Don't do this

Takeaway #3: The efficient research workflow

- Come up with research idea
- Define research question. **Assemble team**
- Write IRB
- **While Waiting for IRB:** write manuscript (intro, methods, part of discussion), define analytic method, identify target journal, draft tables + figures
- Gain data access
- ~~- Define analytic method~~
- **While someone Analyzes,** come up with next research idea
- Review results
- Write manuscript: intro, methods, results, discussion, conclusion
- ~~- Define goal journal, pre-emptively plan for reviewer questions~~
- Submit

Efficient research project



JAMA Surgery | Original Investigation

Practical Computer Vision Application to Compute Total Body Surface Area Burn Reappraising a Fundamental Burn Injury Formula in the Modern Era

Jeff Choi, MD, MSc; Advait Patil; Edward Vendrow; Gavin Touponse, BSc; Layla Aboukhater, BSc;
Joseph D. Forrester, MD, MSc; David A. Spain, MD

Takeaway #4: Four ingredients for productivity (Dr. Joseph Forrester)

Time: Make “writing” a habit

Enthusiasm: Research you care about

Skill: Organization, Analysis, Writing

Team: Follow those who've walked the road (i.e. publication track record)

Takeaway #5: Organize your project

How organized?

If you disappeared before finishing the project: anyone should be able to 1) replicate every result you've found and 2) understand your thought process

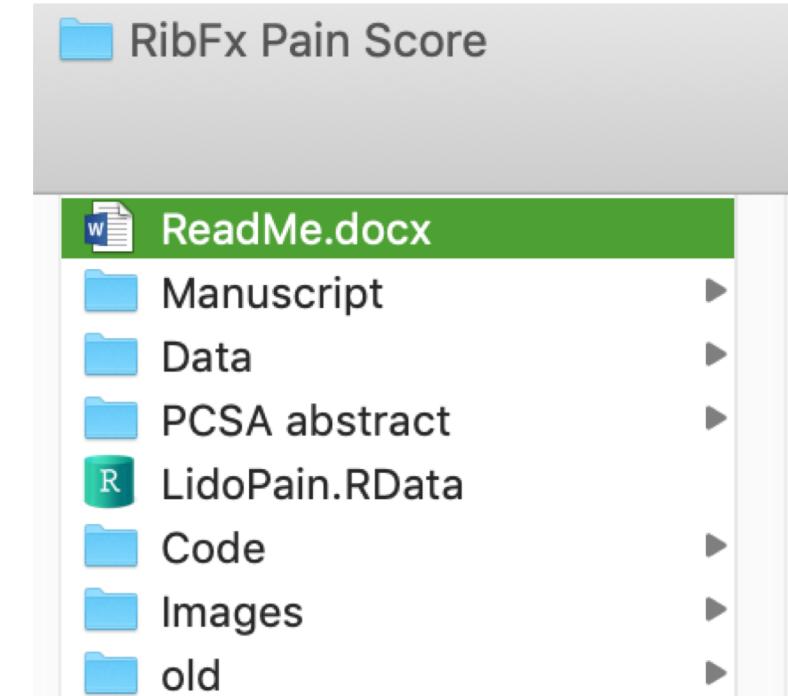
Why?

You will have to re-do analyses to respond to reviewers. If not organized, you will suffer.

Takeaway #5: Organize your project

One folder per project

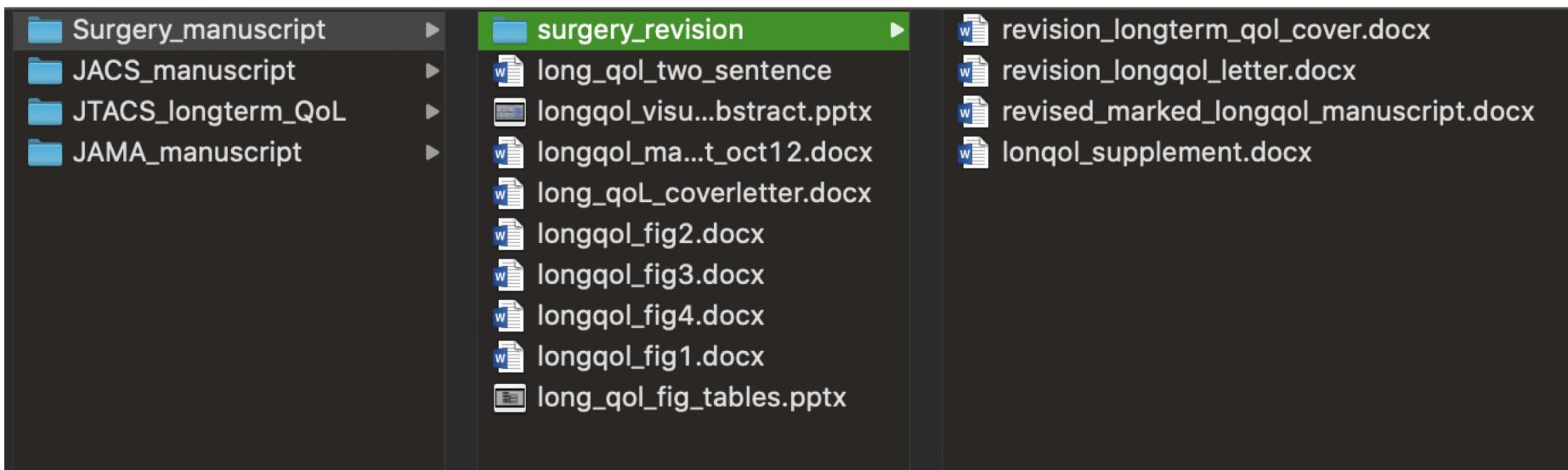
Separate sub-folders for data, analytic code, conference material (e.g. abstract, presentation), manuscript



Tip: “old” folder to continually dump non-active files

Takeaway #5: Organize your project

“Manuscript” folder should have subfolder for every journal you submit to, and a “revision” folder



Takeaway #5: Organize your project

Standardize your file naming system

DON'T DO THIS

Paper_v15.doc
Paper_v16.doc
Paper_v16_final.doc
Paper_v16_FINALFINAL.doc
PAPER_v16_REALFINAL.doc
FINALFINALFINAL_SUBMISSION.doc

DO THIS: project name_content_date*

LungCancerOutcomes_Manuscript_July_18.doc
LungCancerOutcomes_Table1_July_29.doc
LungCancerOutcomes_Manuscript_Aug_7.doc

**don't leave blank spaces within file names
(some coding programs don't like spaces)*

Takeaway #5: Organize your project

Reproducible code is critical for scientific integrity

Given the original dataset and your analytic code, anyone should be able to replicate your results to the teeth.

```
1 ##### This script will calculate TROUT (trauma frailty outcomes) Index scores##  
2 ###input: data frame containing ICD10 codes as column value  
3 ### output: TROUT INDEX score. Optional TROUT INDEX frailty risk strata  
4  
5 ####packages #####  
6 library(dyplr)  
7 library(tidyr)  
8 library(data.table)  
9  
10 #function identify only first 3 characters of ICD10 codes  
11 first3<-function(x) {substr(x,start=1,stop=3)}  
12  
13 #keep only first 3 characters of ICD10 codes within dataframe  
14 #columns containing ICD10 codes titled "I10_DX..." i.e. I10_DX1, I10_DX2,...  
15 df <- df %>%  
16   mutate_at(vars(contains("I10_DX")),first3) %>%  
17   mutate_at(vars(contains("I10_DX")),as.factor)  
18  
19 #create new column for every unique ICD10 code  
20 df_unique_icd10<-df %>% select(UNIQUE_IDENTIFIER, starts_with("I10_DX")) #UNIQUE  
21 df_unique_icd10<-gather(df_unique_icd10,icdcolumn,icdcode,I10_DX1:I10_DX40,fac  
22 df_unique_icd10<-df_unique_icd10[!df_unique_icd10$icdcode=="",]  
23 df_unique_icd10 <- df_unique_icd10 %>% mutate_if(is.character,as.factor)
```

Summary

Publication = currency of academic medicine

Activity is not productivity: every research project should yield a peer-reviewed publication

Develop productive habits (don't multi-task, stay off phone/email while working)

Know how to structure an efficient research workflow

You need: time (make writing a habit), enthusiasm, skill, and the right team

Be super-organized