Memorial Sloan Kettering Cancer Center

It's Time to *Shine* with the *timetrackR* App

April 30, 2020

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Introductions

- Who am I? Research Biostatistician in the Department of Epidemiology & Biostatistics
- What do I do?
  - Retrospective data analysis, end goal is a manuscript in a peer-reviewed journal and/or a conference presentation
  - Protocol development, end goal is a clinical trial research protocol
  - Broken into smaller tasks: project management, data management, statistical analysis, manuscript writing
- Who are my collaborators?
  - Faculty statisticians
  - Clinical researchers

Today's Objectives

I. **Why** track your time?

II. **How** to track your time?

III. **What** to do once you've tracked your time (an introduction to timetrackR)

IV. timetrackR **demo**

V. Useful R code learned in the process

VI. Future work

Why track your time?

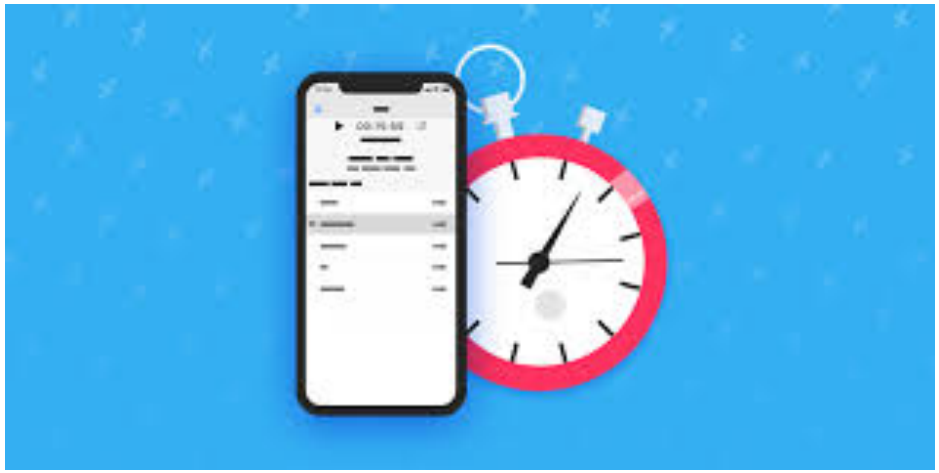
Time & the busy data analyst

- Often feels like there aren't enough hours in the day
- Start working on one project, check email, bounce to another project, maybe remember to go back to first project, and oh look! It's 5pm
- Long term: you have no recollection of how you're spending your days

So what's the problem?

It's hard to manage your time if you don't know how you're spending your time.

How to start tracking your time?



Toggl

- A website or desktop app that can be used to log how you are spending your time
- Can let it run in real time or back-enter tasks
- **Tasks** are grouped by **projects** and **clients**
- Can use **tags** to further identify groups of tasks
- Has functionality for organizing a team and for tracking billable vs non-billable hours

toggl

toggl

Timer

What are you working on?

0:00:00

THIS WEEK: 28:11:38

Thu, 2 Apr **7:36:04**

Review protocol	Lung Cancer Physical Functioning • Moskowitz, Chaya	Project planning	4:15 PM - 5:00 PM	0:45:00
Email	Transplant Pega Tox • Devlin, Sean	Manuscript preparation	3:40 PM - 4:15 PM	0:35:00
2 Meeting	GENIE BPC • Panageas, Kathy		11:30 AM - 3:41 PM	2:39:20
Edit manuscript	Clinical trial/EHR Letter • Panageas, Kathy	Manuscript preparation	12:30 PM - 1:16 PM	0:45:44
Revise tables for SEER-Medicare	Ovarian: Med Onc vs Gyn Onc • Aviki, Em	Manuscript prepar...	11:13 AM - 11:26 AM	0:12:52
Review manuscript	Transplant Pega Tox • Devlin, Sean	Manuscript preparation	10:30 AM - 11:13 AM	0:43:32
Analysis	Systematic Review • Moskowitz, Chaya	Analysis	8:35 AM - 10:30 AM	1:54:36

How I use toggl

- I track the “client” as the faculty statistician I’m working with
  - Could also have used the clinical collaborator, but would have many more clients
- Tags describe project phase (data cleaning, data analysis, manuscript preparation, etc.)
- Descriptions are more variable

Pros & Cons of Toggl

Pros

- Free version available
- Can easily integrate into your workflow
- Not a lot of up-front setup required
- **Can export your data**

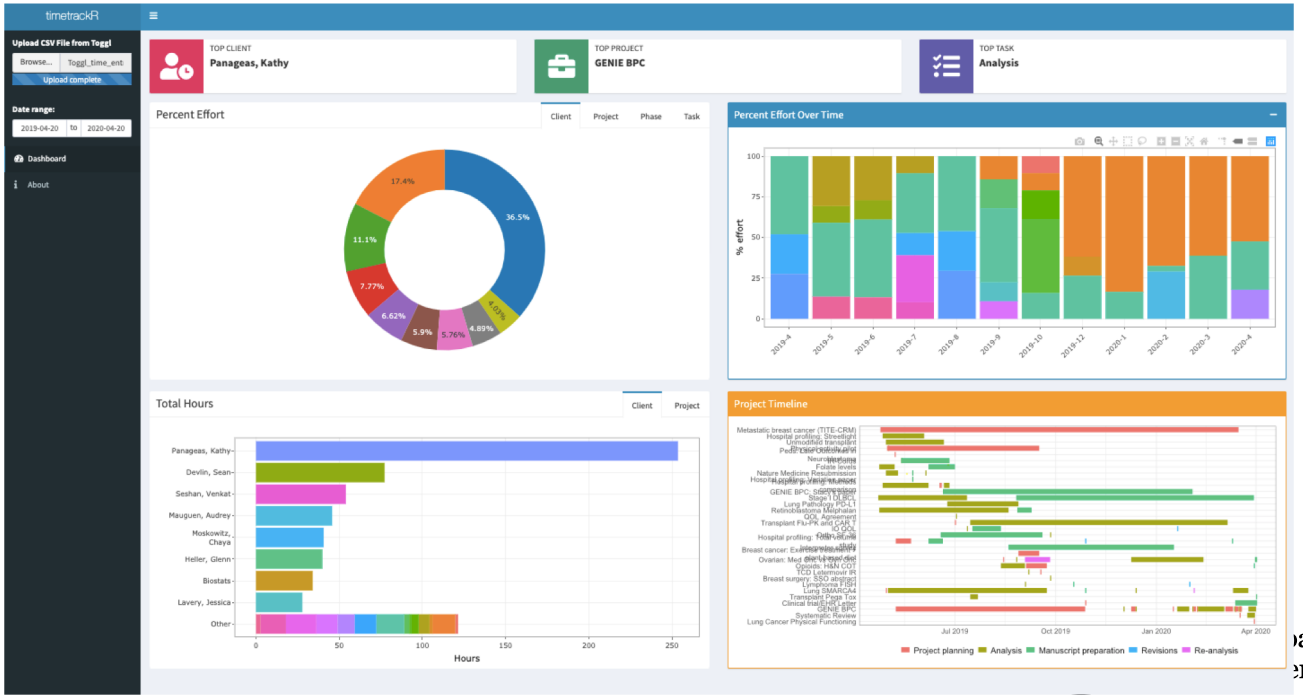
Cons

- Free “insights” only include total hours per day, percent time by project or client
- Paid insights pertain primarily to billable hours, which isn’t as relevant for my work

Thus, a (Shiny) star was born

What is timetrackR?

A *shinydashboard* that takes recorded hours logged in toggl & creates useful data visualizations and summaries of how you're spending your time



timetrackR: Motivation & Goals

- Motivation
  - Interested in full customizability
  - Professional development: Wanted experience with R & Shiny
    - Used previous RLadies presentation to get started: *Learning Shiny with NBA data*
- Goals
  - Wanted simple, easily interpretable metrics/visualization
  - Didn't want to spend all of my time analyzing my time
  - Use for goal-setting and evaluating overall project flow
  - Aid in forecasting/resource allocation decisions
  - Improving efficiency: "Where is my time going and can it be efficiently (re-) directed?"

timetrackR Features

1. **Percent effort**: Time spent per project/client/project phase

2. **Total hours**: Cumulative number of hours spent on a project or working with a client

3. **Project Timeline**: Visualization of project phase by calendar time

Time tracking metrics: Percent effort

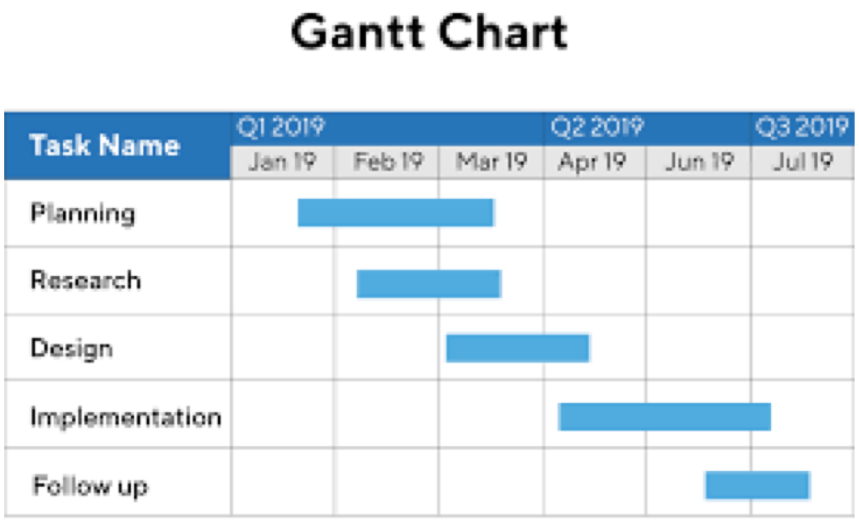
- Allocated vs expended effort
  - Did an investigator ask for “quick help” on a project that is now taking up 20% of my time?
- Task management
  - As a statistician, what percentage of time is spent in meetings vs doing analyses? Does this need to be rebalanced?
  - Are the right projects/tasks being prioritized?
- Protecting your time
  - What percentage of my time am I spending on professional development? Is this more or less than I want it to be?
  - What percentage of my time am I spending on departmental activities (seminars, interviews, etc.) or other non-project work? Am I appropriately accounting for that when estimating how long it will take me to complete a project?

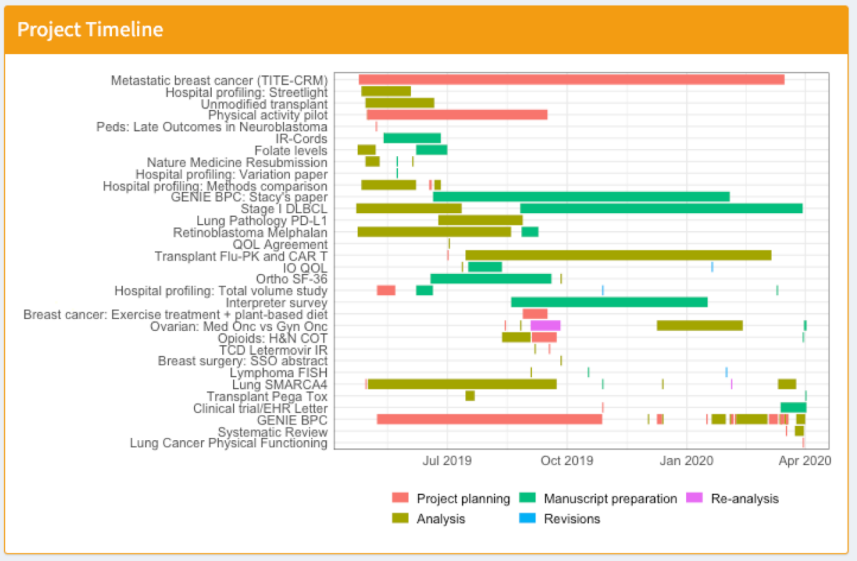
Time tracking metrics: Total hours

- Comparing time invested to products generated
  - For a time-intensive project, was the result multiple manuscripts?
- Determining when to cut your losses and when to pursue a project further
  - “We’ve spent 200+ hours on this project and aren’t close to the deliverable. Is this even going to be feasible?”
  - “We’ve spent 100 hours on work for this conference presentation, should we turn it into a manuscript?”
- Guiding project workflow & managing re-analysis
  - Useful metric for when re-analyses are requested
  - “We’ve spent 130 hours on the analysis, please circulate the manuscript draft before we complete additional analyses.”

Time tracking viz: Project Timeline

- Useful for a big picture overview of what projects are going on & when (and for how long)
  - Based on a Gantt Chart which is usually used prospectively, but good for a year in review when used retrospectively
  - Indicates transitions between analysis and re-analysis, indicates if analyses are happening after a manuscript is drafted, etc.
    - Want to see: Project planning -> Analysis -> Manuscript -> Revisions
    - Do not want to see: Analysis -> Manuscript -> Re-analysis -> Project Planning -> Analysis -> etc.





timetrackR demo

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Information learned from *timetrackR*

- In the last 3 months, >75% of my time has been devoted to a single project. Can we can bring someone else on to that project? (percent effort)
- I spent more hours on a presentation for a conference than I thought I did. Maybe I should turn that into a manuscript? (total hours)
- A particular project transitioned between analysis and re-analysis several times throughout the project's life cycle. Is it time for a regroup with the investigator? (project timeline)

Workflow integration

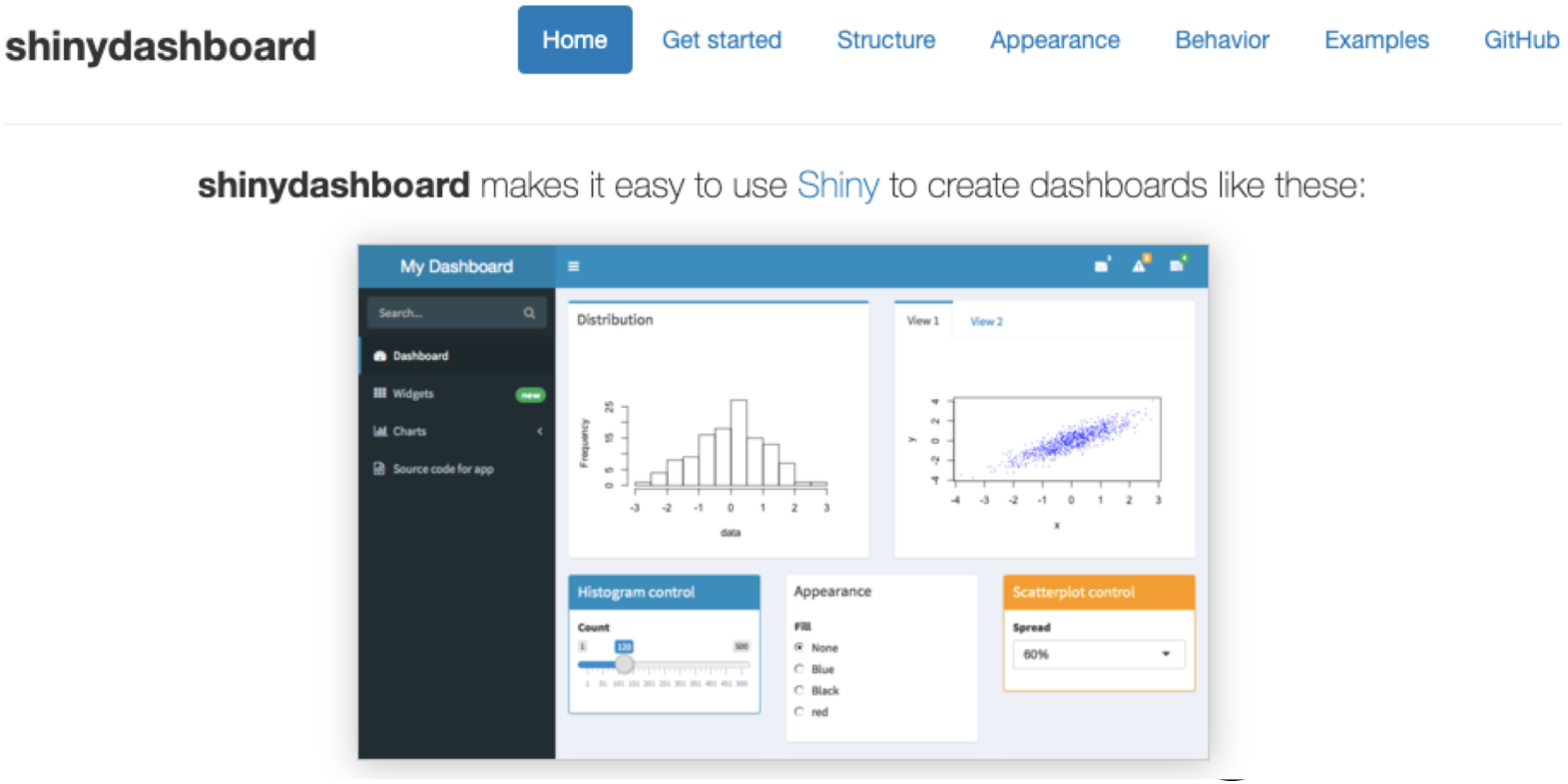
- Daily basis: Use Toggl to record how you're spending your time
  - Requires minimal setup for project/clients
  - Spend <5 minutes a day recording my time
- Weekly? Monthly? Quarterly?: Export data from Toggl into *timetrackR* to look at how you've been spending your time

R Code Highlights:

- shinydashboard
- ggplot::geom_segment()
- hex sticker
- Hosting a shiny app

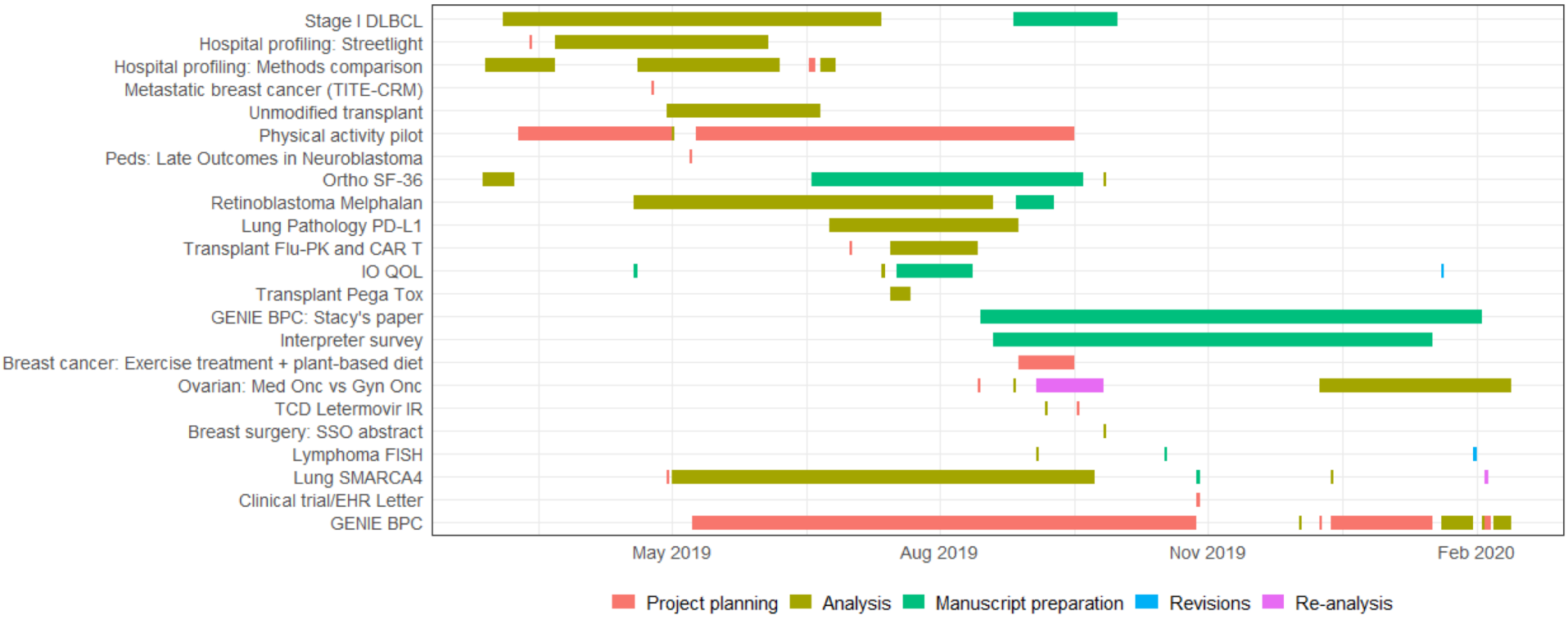
Behind the scenes

- timetrackR originated as a traditional shiny app
  - Previously relied on manual time tracking via Excel spreadsheet
- Its current form is a [shinydashboard]



Project Timeline

- Made using ggplot with geom_segment()



Project Timeline: Data wrangling

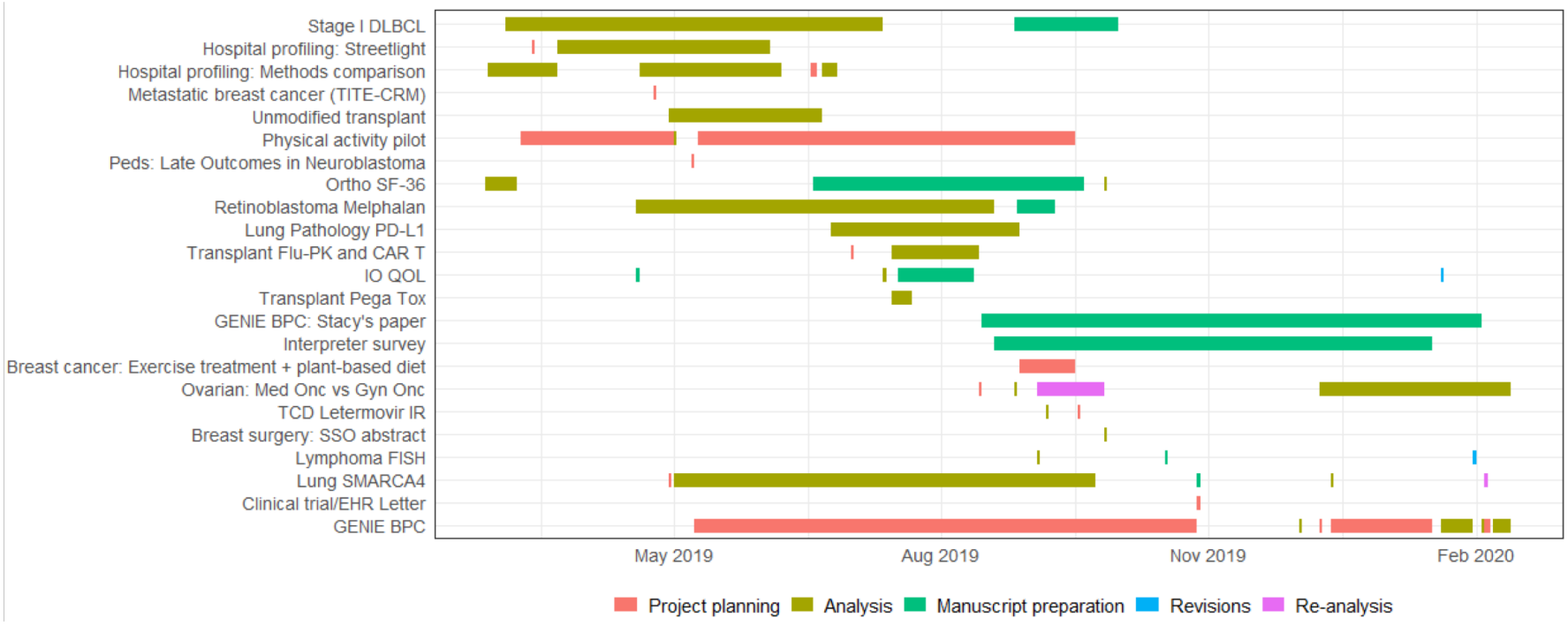
Summarize hourly data into project phase start / stop times

date	hours	study_title	task	project_phase
2020-02-04	0.50	Lung SMARCA4	Meeting	Re-analysis
2020-01-31	1.00	Ovarian: Med Onc vs Gyn Onc	Survival analysis	Analysis
2020-01-17	0.75	Interpreter survey	Review manuscript	Manuscript preparation
2020-02-03	3.00	GENIE BPC	QA Reports	Analysis
2020-01-20	2.00	IO QOL	Respond to reviewer comments	Revisions

study_title	project_phase	start_dt	end_dt
Lung SMARCA4	Project planning	2019-04-29	2019-04-30
Lung SMARCA4	Analysis	2019-05-01	2019-09-23
Lung SMARCA4	Manuscript preparation	2019-10-28	2019-10-29
Lung SMARCA4	Analysis	2019-12-13	2019-12-14
Lung SMARCA4	Re-analysis	2020-02-04	2020-02-05

Project Timeline: Data Viz

```
ggplot(phase_filtered) +
  geom_segment(aes(x = start_dt, xend = end_dt,
                   y = study_title, yend = study_title,
                   colour = project_phase), size = 4) +
  theme_bw() +
  theme(legend.position = "bottom",
        legend.title = element_blank(),
        axis.title = element_blank(),
        axis.ticks = element_blank()) +
  scale_x_date(breaks = "3 months", date_labels = "%b %Y")
```



Unrelated to time tracking: Hex Sticker

```
library(hexSticker)

sticker(# figure information
        subplot = "/calendar_light_orange.png",
        s_x = 1.05, s_y = .7,
        s_width = 0.5, s_height = 0.6,
        # hex sticker information
        h_fill = "#007CBA", h_color = "#006098",
        # package information
        package = "timetrackR",
        p_size = 8, p_color = "#F6C65B")
```

Hosting the shiny app

- *timetrackR* is currently hosted on shinyapps.io
- MSK has access to hosting shiny apps on RConnect
  - Contact Juan Carlos for additional information about how to get set up

Caveats

- Be careful about your denominators: Analysis is based on *what you recorded*
- Entirely retrospective: it's a summary of what you've done, doesn't include projected time allocations

Future Plans

- Incorporate additional visualizations and/or summary measures
  - Suggestions?
- Explore integrating with Toggl's API
- Explore integrating with additional time tracking software other than Toggl

Summary

- Very few metrics are needed to gain a general understanding of how you're spending your time
- This information can be used to align your work with how you *intend* to spend your time

Thank you!

timetrackr.shinyapps.io/timetrackr

Special thanks to Margie Hannum & Karissa Whiting for sharing their creative naming skills to come up with the name of both the app and this talk.

Thanks also to Mike Curry for letting me use his time tracking data in earlier versions of the app and his patience in answering my many R questions.

https://github.com/jalavery/timetrackR

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