You can get your very own copy of this cutting edge sports-data-science package, for free, today!

```
install.packages("JumpeR")
library(JumpeR)
library(flextable)
library(dplyr)
library(ggplot2)

flextable_style <- function(x) {
  x %>%
    flextable() %>%
    bold(part = "header") %>% # bolds header
    bg(bg = "#D3D3D3", part = "header") %>%  # puts gray background behind the
header row
    autofit()
}
```

What does JumpeR do?

`JumpeR` is very similar to `SwimmeR`. They both mostly serve to convert results from human readable documents to machine & human readable data frames in the context of the `R` programming environment.

Supported Results Format

`JumpeR` currently supports single column Hy-Tek results, like these, and Flash Results .pdf files like these. `JumpeR` does not support multi-column Hy-Tek results or Flash .html files. Further details are available in the package readme file.

Examples

A Running Race

Here's an example, reading in the 2019 Ivy League Championships and looking at the finals of the Women's 200M Dash

```
df <- tf_parse(
  read_results("http://www.leonetiming.com/2020/Indoor/IvyLeague/Results.htm")
  )

df %>%
  filter(Event == "Women 200 Meter Dash") %>%
  group_by(Name, Team) %>% # to remove prelims
  slice(2) %>% # to remove prelims
  arrange(Place) %>% # arrange by Place
  flextable_style()
```

Place	Name	Age	Team	Finals_Result	Tiebreaker	DQ	Event
1	Katina Martin	SO	Harvard	24.05		0	Women 200 Meter Dash
2	Olivia Okoli	JR	Harvard	24.44		0	Women 200 Meter Dash
3	Cecil Ene	SR	Penn	24.52	24.511	0	Women 200 Meter Dash
4	Elena Brown-Soler	SR	Penn	24.52	24.520	0	Women 200 Meter Dash

Place	Name	Age	Team	Finals_Result	Tiebreaker	DQ	Event
5	Katie DiFrancesco	JR	Princeton	24.53		0	Women 200 Meter Dash
6	Libby McMahon	SO	Yale	25.12		0	Women 200 Meter Dash
7	Isabella Hilditch	SO	Princeton	40.06		0	Women 200 Meter Dash
	Kennedy Waite	FR	Brown	DNF		1	Women 200 Meter Dash

Discus, with Flights

But wait, there's more! Field events, like jumping and throwing, allow athletes to try several times, with each try called a "flight". Flights can be captured as well. Here's the Men's Discus from the 2019 Virginia Grand Prix

```
df <- tf_parse(
  read_results("https://www.flashresults.com/2019_Meets/Outdoor/04-27_
VirginiaGrandPrix/038-1.pdf"),
  flights = TRUE
  )

df %>%
  flextable_style()
```

Place	Name	Age	Team	Finals_Result	DQ	Event	Flight_1	Flight_2	Flight_3	Flight_4	Flight_5	Flight_6
1	Nicholas EDWARDS	FR	HAMPTON	49.86m	0	Men Discus	X	47.11	45.99	47.28	X	49.86
2	Michael ALBERT	JR	APP STATE	48.30m	0	Men Discus	48.30	47.16	44.96	X	45.85	X
3	Joshua HUNTER	SO	HAMPTON	47.43m	0	Men Discus	31.94	X	46.54	X	47.43	X
4	Peter KENN	SR	APP STATE	46.14m	0	Men Discus	X	42.83	46.14	44.26	43.80	44.66
5	Asher PRINCE	FR	CHARLOTTE	45.98m	0	Men Discus	X	45.98	44.62	X	X	X
6	Sasha DAJIA	SR	CHARLOTTE	44.40m	0	Men Discus	X	44.40	44.19	X	44.08	42.04
7	Britton MANN	SR	HIGH POINT	42.07m	0	Men Discus	X	38.31	X	40.49	X	42.07
8	Gabriel STAINBACK	SO	HIGH POINT	39.37m	0	Men Discus	38.53	36.94	39.37	–	–	–

Place	Name	Age	Team	Finals_Result	DQ	Event	Flight_1	Flight_2	Flight_3	Flight_4	Flight_5	Flight_6
FOUL	Kysheen MYRICK	SO	LIBERTY	FOUL	1	Men Discus	X	X	X			
FOUL	Tyson JONES	FR	VIRGINIA TECH	FOUL	1	Men Discus	X	X	X			

Pole Vault, with Flights and Attempts

`JumpeR` can even capture attempts for vertical jumping events, like in these Women's Pole Vault results from the 2019 Texas A&M Invite. These results do get quite wide, so here they're cut off at Flight 2.

```
df <- tf_parse(
  read_results("https://www.flashresults.com/2019_Meets/Outdoor/04-12_TamuInvite/014-1.pdf"),
  flights = TRUE,
  flight_attempts = TRUE
  )

df %>%
  select(Place:Flight_2_Attempts) %>%
  flextable_style()
```

Place	Name	Age	Team	Finals_Result	DQ	Event	Flight_1	Flight_1_Attempts	Flight_2	Flight_2_Attempts
1	Caroline BELLOWS	SR	UTSA	3.88m	0	Women Pole Vault	3.28	—	3.43	O
2	Myka STEINBEISSER	FR	ARIZONA STATE	3.73m	0	Women Pole Vault	3.28	—	3.43	O
3	Tommi HINTNAUS	SO	ARIZONA STATE	3.73m	0	Women Pole Vault	3.28	—	3.43	—
4	Erika WILLIS	FR	AIR FORCE	3.58m	0	Women Pole Vault	3.28	—	3.43	O
5	Kylie SWIEKATOWSKI	JR	RICE	3.58m	0	Women Pole Vault	3.28	—	3.43	XO
6	Cameron BOEDEKER	JR	SAM HOUSTON ST.	3.58m	0	Women Pole Vault	3.28	—	3.43	O
6	Kendahl SHUE	JR	TCU	3.58m	0	Women Pole Vault	3.28	—	3.43	—

Place	Name	Age	Team	Finals_Result	DQ	Event	Flight_1	Flight_1_Attempts	Flight_2	Flight_2_Attempts
8	Corey FRIEDENBACH	FR	AIR FORCE	3.58m	0	Women Pole Vault	3.28	—	3.43	O
9	Tysen TOWNSEND	FR	TCU	3.58m	0	Women Pole Vault	3.28	—	3.43	XXO
10	Lauren LABAY	JR	SAM HOUSTON ST.	3.43m	0	Women Pole Vault	3.28	—	3.43	O
10	Margaret LASSALLE	SR	SAM HOUSTON ST.	3.43m	0	Women Pole Vault	3.28	—	3.43	O
12	Emily HARRISON	FR	RICE	3.43m	0	Women Pole Vault	3.28	—	3.43	XXO
12	Frankie PORAMBO	FR	AIR FORCE	3.43m	0	Women Pole Vault	3.28	O	3.43	XXO
DNS	Alexandria GRAY	FR	UTSA	DNS	0	Women Pole Vault	3.28		3.43	
NH	Hannah SEARBY	SO	TEXAS A&M	NH	1	Women Pole Vault	3.28	—	3.43	XXX
NH	Jerni SELF	SR	AIR FORCE	NH	1	Women Pole Vault	3.28	—	3.43	—
NH	Kathryn TOMCZAK	SR	AIR FORCE	NH	1	Women Pole Vault	3.28	—	3.43	—

Pole Vault Long Format

These results do get quite wide, but don't worry. Switching to longer is easy as with `JumpeR::attempts_split_long`.

```
df <- tf_parse(
  read_results("https://www.flashresults.com/2019_Meets/Outdoor/04-12_TamuInvite/014-1.pdf"),
  flights = TRUE,
  flight_attempts = TRUE
  )
```

```
df %>%
  attempts_split_long() %>%
  filter(Place == 1) %>% # only first place athlete
  select(Place, Name, Age, Team, Finals_Result, Event, Bar_Height, Attempt,
Result) %>%
  flextable_style()
```

Place	Name	Age	Team	Finals_Result	Event	Bar_Height	Attempt	Result
1	Caroline BELLOWS	SR	UTSA	3.88m	Women Pole Vault	3.28	1	–
1	Caroline BELLOWS	SR	UTSA	3.88m	Women Pole Vault	3.28	2	–
1	Caroline BELLOWS	SR	UTSA	3.88m	Women Pole Vault	3.28	3	–
1	Caroline BELLOWS	SR	UTSA	3.88m	Women Pole Vault	3.43	1	O
1	Caroline BELLOWS	SR	UTSA	3.88m	Women Pole Vault	3.58	1	X
1	Caroline BELLOWS	SR	UTSA	3.88m	Women Pole Vault	3.58	2	O
1	Caroline BELLOWS	SR	UTSA	3.88m	Women Pole Vault	3.73	1	X
1	Caroline BELLOWS	SR	UTSA	3.88m	Women Pole Vault	3.73	2	O
1	Caroline BELLOWS	SR	UTSA	3.88m	Women Pole Vault	3.88	1	X
1	Caroline BELLOWS	SR	UTSA	3.88m	Women Pole Vault	3.88	2	O
1	Caroline BELLOWS	SR	UTSA	3.88m	Women Pole Vault	4.03	1	X
1	Caroline BELLOWS	SR	UTSA	3.88m	Women Pole Vault	4.03	2	X
1	Caroline BELLOWS	SR	UTSA	3.88m	Women Pole Vault	4.03	3	X

Relay Athletes

Going back to those Ivy League results, we can pull out the names relay athletes for each relay.

```
df <- tf_parse(
  read_results("http://www.leonetiming.com/2020/Indoor/IvyLeague/Results.htm"),
  relay_athletes = TRUE
  )

df %>%
  filter(Event == "Men 4x400 Meter Relay") %>%
  select(-Tiebreaker, -Name) %>%
  flextable_style()
```

Place	Age	Team	Finals_Result	DQ	Event	Relay_Athlete_1	Relay_Athlete_2	Relay_Athlete_3	Relay_Athlete_4

Place	Age	Team	Finals_Result	DQ	Event	Relay_Athlete_1	Relay_Athlete_2	Relay_Athlete_3	Relay_Athlete_4
1		Harvard	3:13.85	0	Men 4×400 Meter Relay	Aaron Shirley	Gregory Lapit	Charles Lego	Jovahn Williamson
2		Penn	3:15.55	0	Men 4×400 Meter Relay	Robbie Ruppel	Anthony Okolo	Emerson Douds	Antaures Jackson
3		Yale	3:16.60	0	Men 4×400 Meter Relay	Christopher Colbert	Juma Sei	Phil Zuccaro	Marcus Woods
4		Cornell	3:17.61	0	Men 4×400 Meter Relay	Christian Martin	Myles Solan	Malick Diomande	Tien Henderson
5		Dartmouth	3:17.66	0	Men 4×400 Meter Relay	Mathieu Farber	Charlie Wade	Julian Martelly	Max Frye
6		Columbia	3:19.42	0	Men 4×400 Meter Relay	Chris Balthazar	Jahi Hernandez	Brodie Holmes	Vasilis Kopanas
7		Princeton	3:20.61	0	Men 4×400 Meter Relay	Gregory Sholars	Klaudio Gjetja	Anderson Dimon	Michael Phillippy
8		Brown	3:25.72	0	Men 4×400 Meter Relay	Sergey Gorban	Austin Reynolds	Kevin Boyce	Tim McDonough

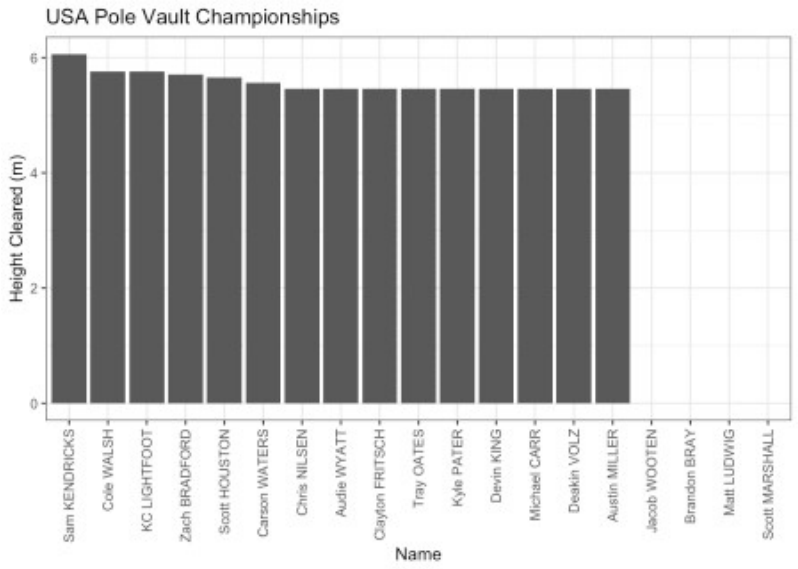
Formating Results

Track and field results are of two forms. Times, as “MM:SS.HH”, and lengths/heights, often as “X.XXm”. `JumpeR` has `math_format` for converting these result strings into numerics, which is useful when doing comparisons and plotting. Here’s the men’s pole vault at the USA T&F 2019 Championships .

```
df <- tf_parse(
  read_results("https://www.flashresults.com/2019_Meets/Outdoor/07-25_USATF_CIS/026-1.pdf"))


df %>%
  mutate(Finals_Math = math_format(Finals_Result)) %>% # results to numerics
```

```
  mutate(Name = factor(Name, unique(Name))) %>% # order names by order of finish
  ggplot(aes(x = Name, y = Finals_Math)) +
  geom_col() +
  theme_bw() +
  theme(axis.text.x = element_text(
    angle = 90,
    vjust = 0.5,
    hjust = 1
  )) +
  labs(y = "Height Cleared (m)",
       title = "USA Pole Vault Championships")
```



One can use `math_format` on mixed format lists too. Times will be converted to seconds, meters will remain in meters, and standard units (feet, inches) will be converted to inches. Units however are not included, so be aware.

```
demo_list <- c(
  "1.23m", # a height/length in meters, output in meters
  "5-06.45", # a height/length in standard, output in inches
  "10:34.34", # a time with minutes, output in seconds
  "9.45" # a time without minutes, output in seconds
)

math_format(demo_list)
## [1]   1.23  66.45 634.34   9.45
```

JumpeR Going Forward