

# 2021 Women's 400m Hurdles World Record Season

Sydney McLaughlin (USA) - 51.46

## Hurdle Touchdown Times

UPDATED  
2025.01.05



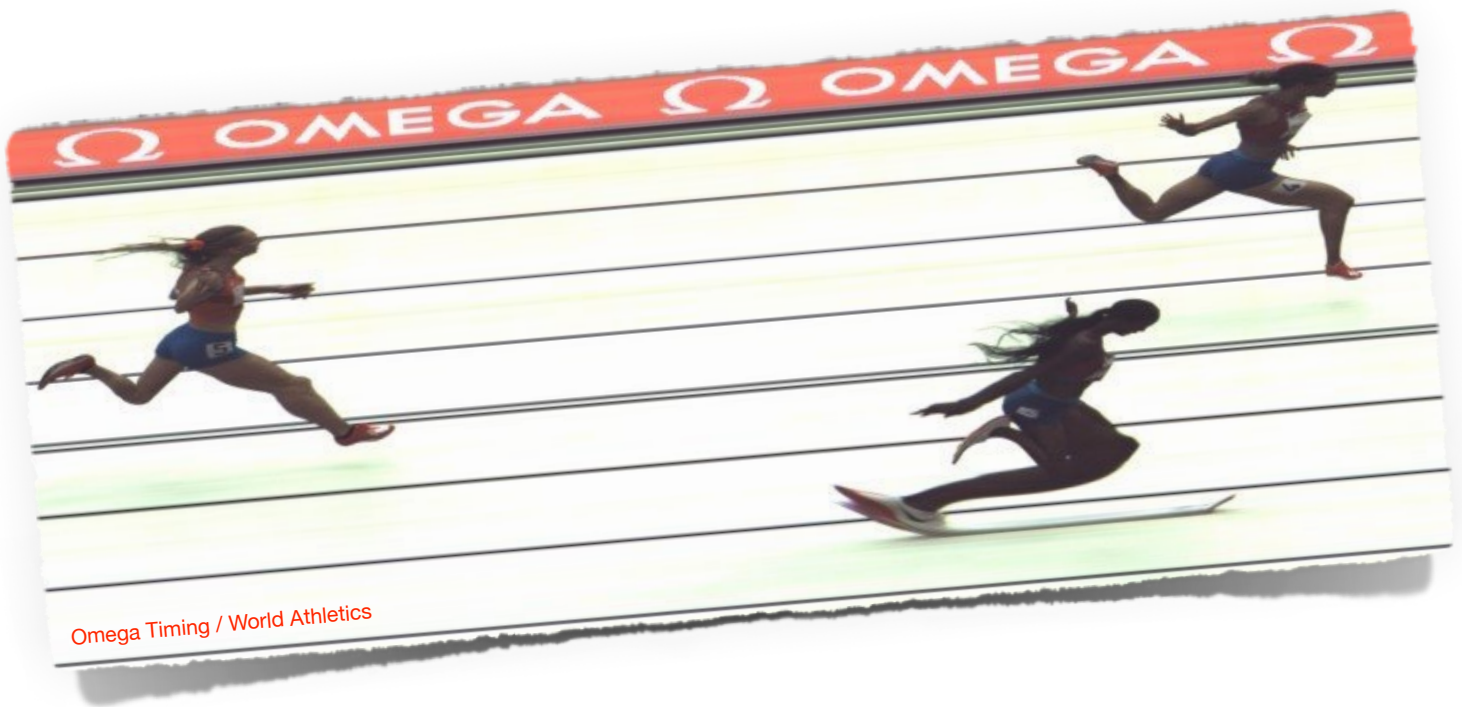
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Todd Henson

## 2021 Women's 400m Hurdles World Record Season Sydney McLaughlin (USA) - 51.46

### Meetings Overview:

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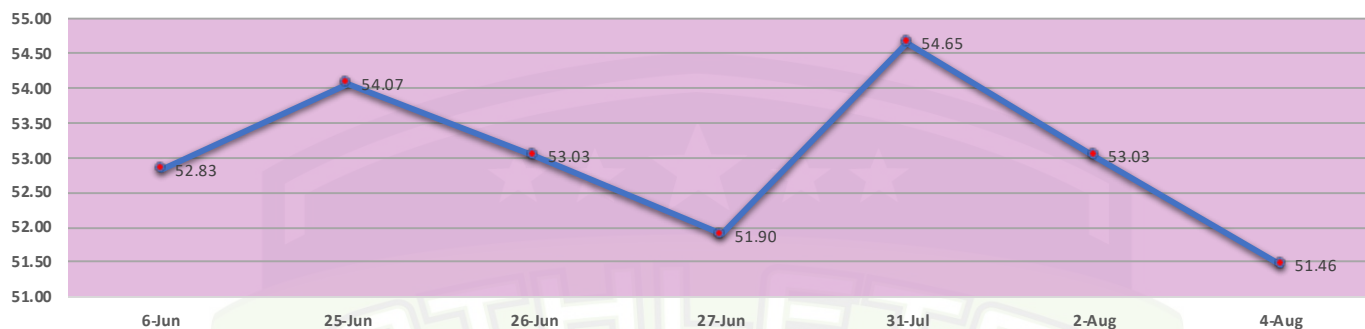


### Notes:

- The times listed as TV Analysis are taken from [youtube.com](https://www.youtube.com) videos and generally coming from Television broadcasts. These are not always the best angles or coverage for getting times. They are often trying to tell a story by focusing on one athlete, and sometimes while shifting camera angles an extra frame can get added or removed.
- Where times are taken from the first movement, instead of the gun, there is at least a  $\pm 0.12$  second difference/error. This will show up from the start to the first hurdle and then from hurdle 10 to the finish. The between hurdle intervals should be fairly consistent, but there is still the usual  $\pm 0.03$  second
- Data errors, missing data, spelling mistakes, anything that need correction - please let me know. As always, I try to put together the most complete and accurate report possible.
- I have done the best I could, I hope people find it useful or at least interesting.

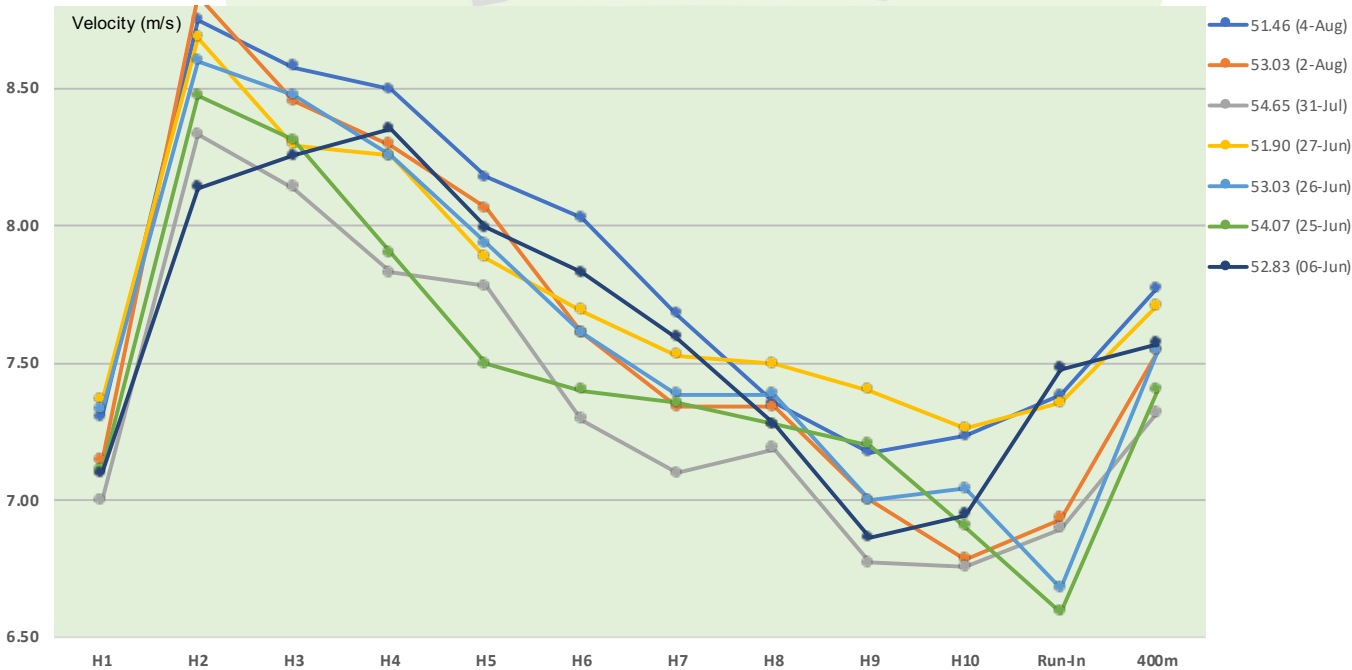


### Sydney McLaughlin 2021



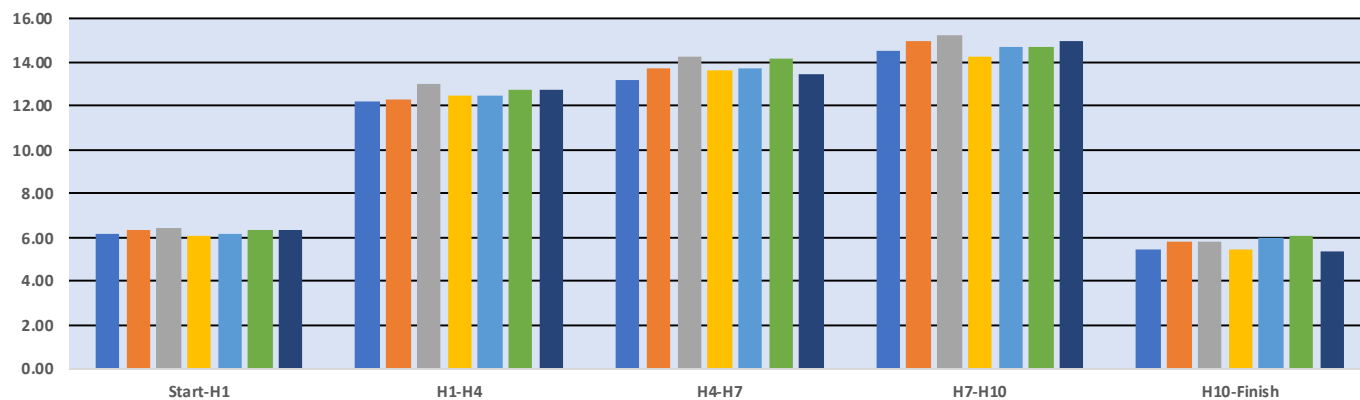
## ATHLETE FIRST

### Hurdle Rhythmic Units



### Time Intervals (s)

### Hurdle Phases





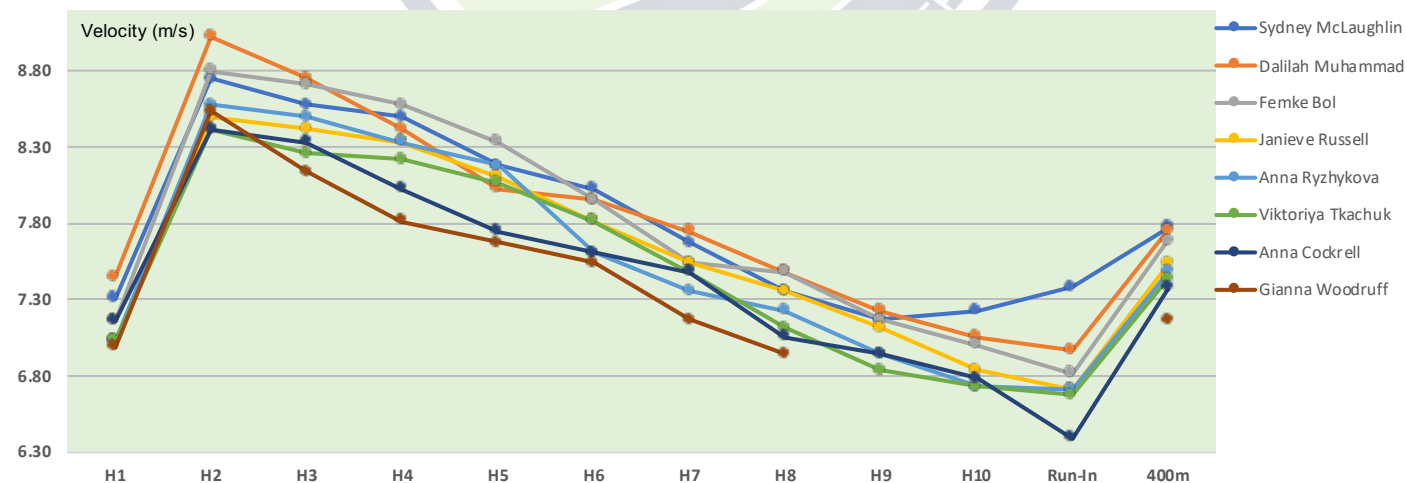
2020 Olympic Games (Tokyo, JPN) (TV Analysis)

Women's 400m Hurdles

Date 2021.08.04

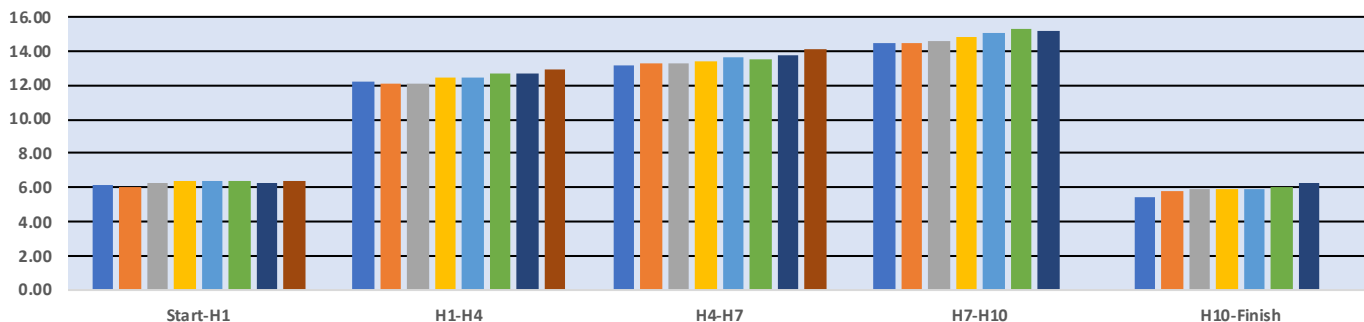
FINAL

|  |               | H1    | H2    | H3    | H4    | H5    | H6    | H7    | H8    | H9    | H10   | Run-In | 400m  | Lane / Place | H1-H4 | H4-H7 | H7-H10 |
|--|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------|-------|-------|--------|
| <b>McLaughlin, Sydney (USA) (1999)</b> | time          | 6.16  | 10.16 | 14.24 | 18.36 | 22.64 | 27.00 | 31.56 | 36.32 | 41.20 | 46.04 | 51.46  | 51.46 | 4 / 1        |       |       |        |
|  | reaction time | 0.163 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval      |       | 4.00  | 4.08  | 4.12  | 4.28  | 4.36  | 4.56  | 4.76  | 4.88  | 4.84  | 5.42   | WR    |              | 12.20 | 13.20 | 14.48  |
|  | velocity      | 7.31  | 8.75  | 8.58  | 8.50  | 8.18  | 8.03  | 7.68  | 7.35  | 7.17  | 7.23  | 7.38   | 7.77  |              | 8.61  | 7.95  | 7.25   |
| H1 lead leg                            | R             |       |       |       |       |       |       |       |       |       |       |        | 170.5 |              |       |       |        |
| <b>Muhammad, Dalilah (USA) (1990)</b>  | time          | 6.04  | 9.92  | 13.92 | 18.08 | 22.44 | 26.84 | 31.36 | 36.04 | 40.88 | 45.84 | 51.58  | 51.58 | 7 / 2        |       |       |        |
|  | reaction time | 0.200 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval      |       | 3.88  | 4.00  | 4.16  | 4.36  | 4.40  | 4.52  | 4.68  | 4.84  | 4.96  | 5.74   | PB    |              | 12.04 | 13.28 | 14.48  |
|  | velocity      | 7.45  | 9.02  | 8.75  | 8.41  | 8.03  | 7.95  | 7.74  | 7.48  | 7.23  | 7.06  | 6.97   | 7.75  |              | 8.72  | 7.91  | 7.25   |
| H1 lead leg                            | R             |       |       |       |       |       |       |       |       |       |       | 176    |       |              |       |       |        |
| <b>Bol, Femke (NED) (2000)</b>         | time          | 6.28  | 10.26 | 14.28 | 18.36 | 22.56 | 26.96 | 31.60 | 36.28 | 41.16 | 46.16 | 52.03  | 52.03 | 5 / 3        |       |       |        |
|  | reaction time | 0.165 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval      |       | 3.98  | 4.02  | 4.08  | 4.20  | 4.40  | 4.64  | 4.68  | 4.88  | 5.00  | 5.87   | AR    |              | 12.08 | 13.24 | 14.56  |
|  | velocity      | 7.17  | 8.79  | 8.71  | 8.58  | 8.33  | 7.95  | 7.54  | 7.48  | 7.17  | 7.00  | 6.81   | 7.69  |              | 8.69  | 7.93  | 7.21   |
| H1 lead leg                            | L             |       |       |       |       |       |       |       |       |       |       | 176    |       |              |       |       |        |
| <b>Russell, Janieve (JAM) (1993)</b>   | time          | 6.40  | 10.52 | 14.68 | 18.88 | 23.20 | 27.68 | 32.32 | 37.08 | 42.00 | 47.12 | 53.08  | 53.08 | 6 / 4        |       |       |        |
|  | reaction time | 0.136 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval      |       | 4.12  | 4.16  | 4.20  | 4.32  | 4.48  | 4.64  | 4.76  | 4.92  | 5.12  | 5.96   | PB    |              | 12.48 | 13.44 | 14.80  |
|  | velocity      | 7.03  | 8.50  | 8.41  | 8.33  | 8.10  | 7.81  | 7.54  | 7.35  | 7.11  | 6.84  | 6.71   | 7.54  |              | 8.41  | 7.81  | 7.09   |
| H1 lead leg                            | R             |       |       |       |       |       |       |       |       |       |       | 181.7  |       |              |       |       |        |
| <b>Ryzhykova, Anna (UKR) (1989)</b>    | time          | 6.40  | 10.48 | 14.60 | 18.80 | 23.08 | 27.68 | 32.44 | 37.28 | 42.32 | 47.52 | 53.48  | 53.48 | 2 / 5        |       |       |        |
|  | reaction time | 0.177 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval      |       | 4.08  | 4.12  | 4.26  | 4.34  | 4.48  | 4.68  | 4.84  | 5.04  | 5.20  | 5.96   |       |              | 12.40 | 13.64 | 15.08  |
|  | velocity      | 7.03  | 8.58  | 8.50  | 8.33  | 8.18  | 7.61  | 7.35  | 7.23  | 6.94  | 6.73  | 6.71   | 7.48  |              | 8.47  | 7.70  | 6.96   |
| H1 lead leg                            | R             |       |       |       |       |       |       |       |       |       |       | 173.2  |       |              |       |       |        |
| <b>Tkachuk, Viktoriya (UKR) (1994)</b> | time          | 6.40  | 10.56 | 14.80 | 19.06 | 23.40 | 27.88 | 32.56 | 37.48 | 42.60 | 47.80 | 53.79  | 53.79 | 3 / 6        |       |       |        |
|  | reaction time | 0.206 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval      |       | 4.16  | 4.24  | 4.26  | 4.34  | 4.48  | 4.68  | 4.92  | 5.12  | 5.20  | 5.99   | PB    |              | 12.66 | 13.50 | 15.24  |
|  | velocity      | 7.03  | 8.41  | 8.25  | 8.22  | 8.06  | 7.81  | 7.48  | 7.11  | 6.84  | 6.73  | 6.68   | 7.44  |              | 8.29  | 7.78  | 6.89   |
| H1 lead leg                            | L             |       |       |       |       |       |       |       |       |       |       | 179.7  |       |              |       |       |        |
| <b>Cockrell, Anna (USA) (1997)</b>     | time          | 6.28  | 10.44 | 14.64 | 19.00 | 23.52 | 28.12 | 32.80 | 37.76 | 42.80 | 47.96 | 54.22  | 54.22 | 8 / 7        |       |       |        |
|  | reaction time |       |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval      |       | 4.16  | 4.20  | 4.36  | 4.52  | 4.60  | 4.68  | 4.96  | 5.04  | 5.16  | 6.26   | DQ    |              | 12.72 | 13.80 | 15.16  |
|  | velocity      | 7.17  | 8.41  | 8.33  | 8.03  | 7.74  | 7.61  | 7.48  | 7.06  | 6.94  | 6.78  | 6.39   | 7.38  |              | 8.25  | 7.61  | 6.93   |
| H1 lead leg                            | L             |       |       |       |       |       |       |       |       |       |       | 160    |       |              |       |       |        |
| <b>Woodruff, Gianna (PAN) (1993)</b>   | time          | 6.44  | 10.54 | 14.84 | 19.32 | 23.88 | 28.52 | 33.40 | 38.44 |       |       | 55.84  | 55.84 | 9 / 7        |       |       |        |
|  | reaction time | 0.235 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval      |       | 4.10  | 4.30  | 4.48  | 4.56  | 4.64  | 4.88  | 5.04  |       |       |        |       |              |       |       |        |
|  | velocity      | 6.99  | 8.54  | 8.14  | 7.81  | 7.68  | 7.54  | 7.17  | 6.94  |       |       |        |       |              |       |       |        |
| H1 lead leg                            | L             |       |       |       |       |       |       |       |       |       |       | 128    |       |              |       |       |        |



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=-BT0qOqSR-k>

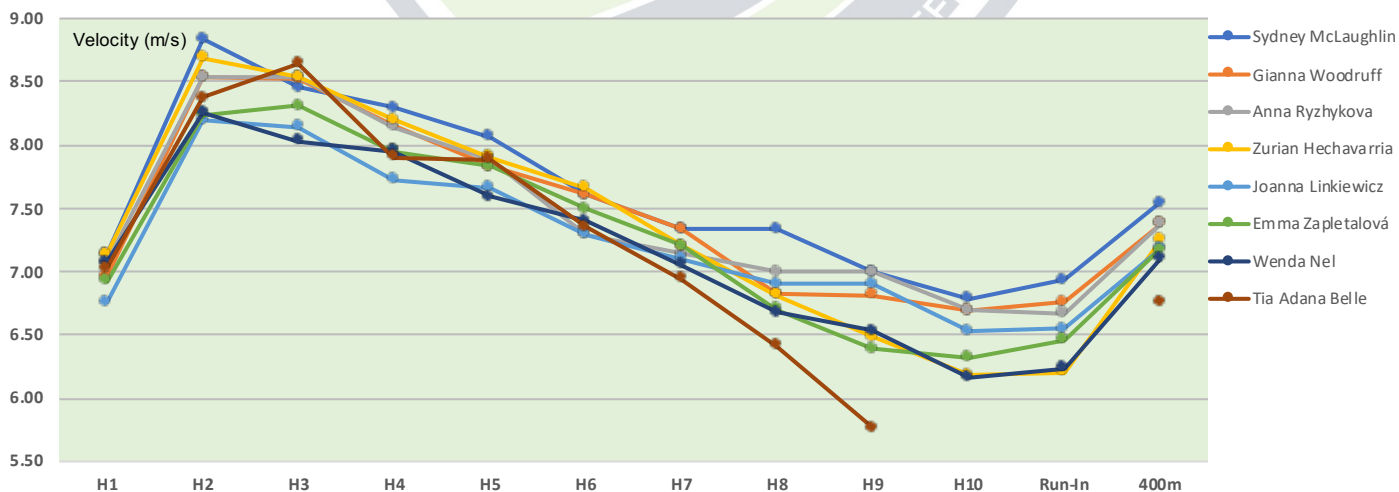
2020 Olympic Games (Tokyo, JPN) (TV Analysis)

Women's 400m Hurdles

Date 2021.08.02

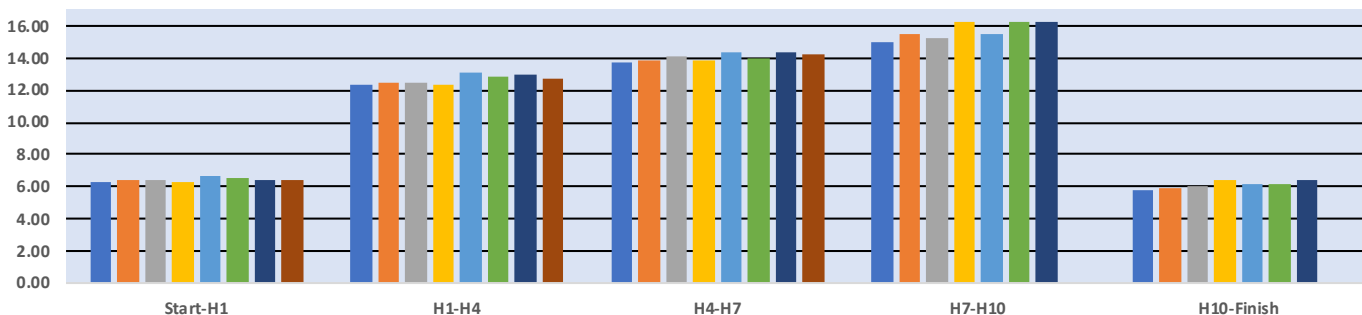
Semi-Final 2

|   |               | H1    | H2    | H3    | H4    | H5    | H6    | H7    | H8    | H9    | H10   | Run-In | 400m  | Lane / Place | H1-H4 | H4-H7 | H7-H10 |
|---|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------|-------|-------|--------|
| <b>McLaughlin, Sydney (USA) (1999)</b>  | time          | 6.30  | 10.26 | 14.40 | 18.62 | 22.96 | 27.56 | 32.33 | 37.10 | 42.10 | 47.26 |        | 53.03 | 5 / 1        |       |       |        |
|   | reaction time | 0.204 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|   | interval      |       | 3.96  | 4.14  | 4.22  | 4.34  | 4.60  | 4.77  | 4.77  | 5.00  | 5.16  | 5.77   |       |              | 12.32 | 13.71 | 14.93  |
|   | velocity      | 7.14  | 8.84  | 8.45  | 8.29  | 8.06  | 7.61  | 7.34  | 7.34  | 7.00  | 6.78  | 6.93   | 7.54  |              | 8.52  | 7.66  | 7.03   |
| H1 lead leg                             | R             |       |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
| <b>Woodruff, Gianna (PAN) (1993)</b>    | time          | 6.46  | 10.56 | 14.67 | 18.96 | 23.43 | 28.03 | 32.80 | 37.93 | 43.07 | 48.30 |        | 54.22 | 4 / 2        |       |       |        |
|   | reaction time | 0.207 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|   | interval      |       | 4.10  | 4.11  | 4.29  | 4.47  | 4.60  | 4.77  | 5.13  | 5.14  | 5.23  | 5.92   | AR PB |              | 12.50 | 13.84 | 15.50  |
|   | velocity      | 6.97  | 8.54  | 8.52  | 8.16  | 7.83  | 7.61  | 7.34  | 6.82  | 6.81  | 6.69  | 6.76   | 7.38  |              | 8.40  | 7.59  | 6.77   |
| H1 lead leg                             | L             |       |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
| <b>Ryzhykova, Anna (UKR) (1989)</b>     | time          | 6.36  | 10.46 | 14.56 | 18.86 | 23.30 | 28.10 | 33.00 | 38.00 | 43.00 | 48.23 |        | 54.23 | 6 / 3        |       |       |        |
|   | reaction time | 0.162 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|   | interval      |       | 4.10  | 4.10  | 4.30  | 4.44  | 4.80  | 4.90  | 5.00  | 5.00  | 5.23  | 6.00   |       |              | 12.50 | 14.14 | 15.23  |
|   | velocity      | 7.08  | 8.54  | 8.54  | 8.14  | 7.88  | 7.29  | 7.14  | 7.00  | 7.00  | 6.69  | 6.67   | 7.38  |              | 8.40  | 7.43  | 6.89   |
| H1 lead leg                             | R             |       |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
| <b>Hechavarria, Zurian (CUB) (1995)</b> | time          | 6.30  | 10.33 | 14.43 | 18.70 | 23.13 | 27.70 | 32.56 | 37.70 | 43.10 | 48.76 |        | 55.21 | 3 / 4        |       |       |        |
|   | reaction time | 0.167 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|   | interval      |       | 4.03  | 4.10  | 4.27  | 4.43  | 4.57  | 4.86  | 5.14  | 5.40  | 5.66  | 6.45   |       |              | 12.40 | 13.86 | 16.20  |
|   | velocity      | 7.14  | 8.68  | 8.54  | 8.20  | 7.90  | 7.66  | 7.20  | 6.81  | 6.48  | 6.18  | 6.20   | 7.25  |              | 8.47  | 7.58  | 6.48   |
| H1 lead leg                             | L             |       |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
| <b>Linkiewicz, Joanna (POL) (1990)</b>  | time          | 6.66  | 10.93 | 15.23 | 19.76 | 24.33 | 29.13 | 34.06 | 39.13 | 44.20 | 49.56 |        | 55.67 | 9 / 5        |       |       |        |
|   | reaction time | 0.157 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|   | interval      |       | 4.27  | 4.30  | 4.53  | 4.47  | 4.80  | 4.93  | 5.07  | 5.07  | 5.36  | 6.11   |       |              | 13.10 | 14.30 | 15.50  |
|   | velocity      | 6.76  | 8.20  | 8.14  | 7.73  | 7.66  | 7.29  | 7.10  | 6.90  | 6.90  | 6.53  | 6.55   | 7.19  |              | 8.02  | 7.34  | 6.77   |
| H1 lead leg                             | L             |       |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
| <b>Zapletalová, Emma (SVK) (2000)</b>   | time          | 6.50  | 10.75 | 14.96 | 19.36 | 23.83 | 28.50 | 33.36 | 38.58 | 44.06 | 49.60 |        | 55.79 | 2 / 6        |       |       |        |
|   | reaction time | 0.136 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|   | interval      |       | 4.25  | 4.21  | 4.40  | 4.40  | 4.67  | 4.86  | 5.22  | 5.48  | 5.54  | 6.19   |       |              | 12.86 | 14.00 | 16.24  |
|   | velocity      | 6.92  | 8.24  | 8.31  | 7.95  | 7.83  | 7.49  | 7.20  | 6.70  | 6.39  | 6.32  | 6.46   | 7.17  |              | 8.16  | 7.50  | 6.47   |
| H1 lead leg                             | R             |       |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
| <b>Nel, Wenda (RSA) (1988)</b>          | time          | 6.36  | 10.60 | 14.96 | 19.36 | 23.97 | 28.70 | 33.66 | 38.90 | 44.26 | 49.94 |        | 56.35 | 8 / 7        |       |       |        |
|   | reaction time | 0.189 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|   | interval      |       | 4.24  | 4.36  | 4.40  | 4.61  | 4.73  | 4.96  | 5.24  | 5.36  | 5.68  | 6.41   |       |              | 13.00 | 14.30 | 16.28  |
|   | velocity      | 7.08  | 8.25  | 8.03  | 7.95  | 7.59  | 7.40  | 7.06  | 6.68  | 6.53  | 6.16  | 6.24   | 7.10  |              | 8.08  | 7.34  | 6.45   |
| H1 lead leg                             | L             |       |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
| <b>Belle, Tia Adana (BAR) (1996)</b>    | time          | 6.40  | 10.58 | 14.63 | 19.06 | 23.50 | 28.26 | 33.30 | 38.76 | 44.83 |       |        | 59.26 | 7 / 8        |       |       |        |
|   | reaction time | 0.146 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|   | interval      |       | 4.18  | 4.05  | 4.43  | 4.44  | 4.76  | 5.04  | 5.46  | 6.07  |       |        |       |              | 12.66 | 14.24 |        |
|   | velocity      | 7.03  | 8.37  | 8.64  | 7.90  | 7.88  | 7.35  | 6.94  | 6.41  | 5.77  |       |        | 6.75  |              | 8.29  | 7.37  |        |
| H1 lead leg                             | L             |       |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: <https://www.olympics.com/en/video/track-and-field/day-10-evening-session-athletics-tokyo-2020-replays>

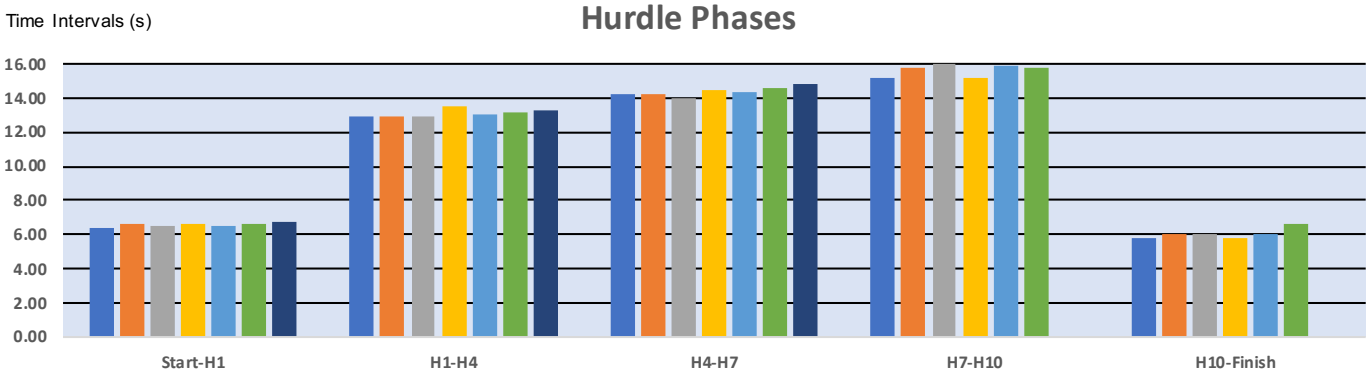
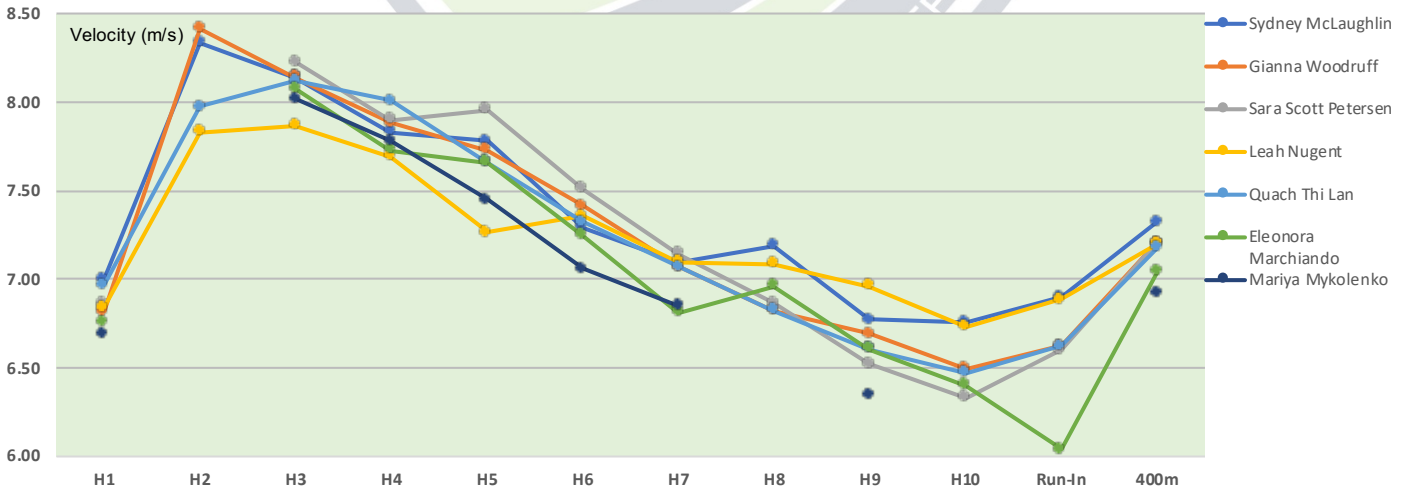
2020 Olympic Games (Tokyo, JPN) (TV Analysis)

Women's 400m Hurdles

Date 2021.07.31

Heat 3

|  |               | H1    | H2               | H3    | H4    | H5    | H6    | H7    | H8    | H9    | H10   | Run-In | 400m  | Lane / Place | H1-H4                    | H4-H7 | H7-H10 |       |      |      |      |
|--|---------------|-------|------------------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------|--------------------------|-------|--------|-------|------|------|------|
| <b>McLaughlin, Sydney (USA) (1999)</b>   | time          | 6.43  | 10.63            | 14.93 | 19.40 | 23.90 | 28.70 | 33.63 | 38.50 | 43.67 | 48.85 |        | 54.65 | 5 / 1        | 12.97                    | 14.23 | 15.22  |       |      |      |      |
|  | reaction time | 0.180 |                  |       |       |       |       |       |       |       |       |        |       |              |                          |       |        | 8.10  | 7.38 | 6.90 |      |
|  | interval      |       | 4.20             | 4.30  | 4.47  | 4.50  | 4.80  | 4.93  | 4.87  | 5.17  | 5.18  | 5.80   |       |              |                          |       |        |       |      |      |      |
|  | velocity      | 7.00  | 8.33             | 8.14  | 7.83  | 7.78  | 7.29  | 7.10  | 7.19  | 6.77  | 6.76  | 6.90   | 7.32  |              |                          |       |        |       |      |      |      |
| H1 lead leg                              | R             |       |                  |       | 14    | 14    | 14    | 15    | 15    | 15    | 16    | 16     | 18.5  |              |                          |       |        |       |      |      |      |
| <b>Woodruff, Gianna (PAN) (1993)</b>     | time          | 6.60  | 10.76            | 15.06 | 19.50 | 24.03 | 28.75 | 33.70 | 38.83 | 44.06 | 49.45 |        | 55.49 | 7 / 2        | 12.90                    | 14.20 | 15.75  |       |      |      |      |
|  | reaction time | 0.268 |                  |       |       |       |       |       |       |       |       |        |       |              |                          |       |        | 8.14  | 7.39 | 6.67 |      |
|  | interval      |       | 4.16             | 4.30  | 4.44  | 4.53  | 4.72  | 4.95  | 5.13  | 5.23  | 5.39  | 6.04   |       |              |                          |       |        |       |      |      |      |
|  | velocity      | 6.82  | 8.41             | 8.14  | 7.88  | 7.73  | 7.42  | 7.07  | 6.82  | 6.69  | 6.49  | 6.62   | 7.21  |              |                          |       |        |       |      |      |      |
| H1 lead leg                              | L             |       |                  |       | 15    | 15    | 15    | 15    | 16    | 16    | 17    | 19     | 181   |              |                          |       |        |       |      |      |      |
| <b>Petersen, Sara Scott (DEN) (1987)</b> | time          | 6.56  |                  | 15.07 | 19.50 | 23.90 | 28.56 | 33.46 | 38.56 | 43.93 | 49.46 |        | 55.52 | 9 / 3        | 12.94                    | 13.96 | 16.00  |       |      |      |      |
|  | reaction time | 0.161 |                  |       |       |       |       |       |       |       |       |        |       |              |                          |       |        | 8.11  | 7.52 | 6.56 |      |
|  | interval      |       |                  | 8.51  | 4.43  | 4.40  | 4.66  | 4.90  | 5.10  | 5.37  | 5.53  | 6.06   |       |              |                          |       |        |       |      |      |      |
|  | velocity      | 6.86  |                  | 8.23  | 7.90  | 7.95  | 7.51  | 7.14  | 6.86  | 6.52  | 6.33  | 6.60   | 7.20  |              |                          |       |        |       |      |      |      |
| H1 lead leg                              | R             |       | 15               |       | 15    | 15    | 15    | 15    | 16    | 17    | 17    | 19.7   |       |              |                          |       |        |       |      |      |      |
| <b>Nugent, Leah (JAM) 1992)</b>          | time          | 6.58  | 11.05            | 15.50 | 20.05 | 24.87 | 29.63 | 34.56 | 39.50 | 44.53 | 49.73 |        | 55.54 | 6 / 4        | (no official time given) | 13.47 | 14.51  | 15.17 |      |      |      |
|  | reaction time | 0.240 |                  |       |       |       |       |       |       |       |       |        |       |              |                          |       |        |       | 7.80 | 7.24 | 6.92 |
|  | interval      |       | 4.47             | 4.45  | 4.55  | 4.82  | 4.76  | 4.93  | 4.94  | 5.03  | 5.20  | 5.81   |       |              |                          |       |        |       |      |      |      |
|  | velocity      | 6.84  | 7.83             | 7.87  | 7.69  | 7.26  | 7.35  | 7.10  | 7.09  | 6.96  | 6.73  | 6.88   | 7.20  |              |                          |       |        |       |      |      |      |
| H1 lead leg                              | R             |       | 15               | 14    | 14    | 15    | 15    | 15    | 15    | 15    | 15    | 18.2   |       |              |                          |       |        |       |      |      |      |
| <b>Quach Thi Lan (VIE) (1995)</b>        | time          | 6.46  | 10.85            | 15.16 | 19.53 | 24.10 | 28.88 | 33.83 | 38.96 | 44.26 | 49.67 |        | 55.71 | 8 / 4        | 13.07                    | 14.30 | 15.84  |       |      |      |      |
|  | reaction time | 0.150 |                  |       |       |       |       |       |       |       |       |        |       |              |                          |       |        | 8.03  | 7.34 | 6.63 |      |
|  | interval      |       | 4.39             | 4.31  | 4.37  | 4.57  | 4.83  | 4.95  | 5.13  | 5.30  | 5.41  | 6.04   |       |              |                          |       |        |       |      |      |      |
|  | velocity      | 6.97  | 7.97             | 8.12  | 8.01  | 7.66  | 7.32  | 7.07  | 6.82  | 6.60  | 6.47  | 6.62   | 7.18  |              |                          |       |        |       |      |      |      |
| H1 lead leg                              | R             |       | 15               | 15    | 15    | 15    | 15    | 15    | 16    | 16    | 16    | 19     |       |              |                          |       |        |       |      |      |      |
| <b>Marchiando, Eleonora (ITA) (1997)</b> | time          | 6.66  |                  | 15.33 | 19.86 | 24.43 | 29.26 | 34.40 | 39.43 | 44.73 | 50.20 |        | 56.82 | 3 / 5        | 13.20                    | 14.54 | 15.80  |       |      |      |      |
|  | reaction time | 0.166 |                  |       |       |       |       |       |       |       |       |        |       |              |                          |       |        | 7.95  | 7.22 | 6.65 |      |
|  | interval      |       |                  | 8.67  | 4.53  | 4.37  | 4.57  | 4.83  | 5.14  | 5.03  | 5.47  | 6.62   |       |              |                          |       |        |       |      |      |      |
|  | velocity      | 6.76  |                  | 8.07  | 7.73  | 7.66  | 7.25  | 6.81  | 6.96  | 6.60  | 6.40  | 6.04   | 7.04  |              |                          |       |        |       |      |      |      |
| H1 lead leg                              | L             |       |                  |       | 16    | 16    | 16    | 17    | 17    | 17    | 17    | 21.2   |       |              |                          |       |        |       |      |      |      |
| <b>Mykolenko, Mariya (UKR) (1994)</b>    | time          | 6.73  |                  | 15.46 | 19.96 | 24.66 | 29.62 | 34.73 |       | 45.76 |       | 57.86  | 4 / 6 | 13.23        | 14.77                    |       |        |       |      |      |      |
|  | reaction time | 0.200 |                  |       |       |       |       |       |       |       |       |        |       |              |                          | 7.94  | 7.11   |       |      |      |      |
|  | interval      |       |                  | 8.73  | 4.50  | 4.70  | 4.96  | 5.11  |       | 11.03 |       |        |       |              |                          |       |        |       |      |      |      |
|  | velocity      | 6.69  |                  | 8.02  | 7.78  | 7.45  | 7.06  | 6.85  |       | 6.35  |       |        |       |              |                          |       |        |       |      |      |      |
| H1 lead leg                              | R             |       | 15               |       | 15    | 15    | 16    | 16    |       | 16    |       |        |       |              |                          |       |        |       |      |      |      |
| <b>Knight, Jessie (GBR) (1994)</b>       | time          |       | fell into hurdle |       |       |       |       |       |       |       |       |        |       | dnf          | 2 / --                   |       |        |       |      |      |      |
|  | reaction time | 0.160 |                  |       |       |       |       |       |       |       |       |        |       |              |                          |       |        |       |      |      |      |
|  | interval      |       |                  |       |       |       |       |       |       |       |       |        |       |              |                          |       |        |       |      |      |      |
|  | velocity      |       |                  |       |       |       |       |       |       |       |       |        |       |              |                          |       |        |       |      |      |      |
| H1 lead leg                              | R             |       | 23               |       |       |       |       |       |       |       |       |        |       |              | 23                       |       |        |       |      |      |      |



Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 1920 x 1080 @ 30fps  
 Timing From: First Movement  
 Source: <https://www.olympics.com/en/video/track-and-field-day-8-morning-session-athletics-tokyo-2020-replays>

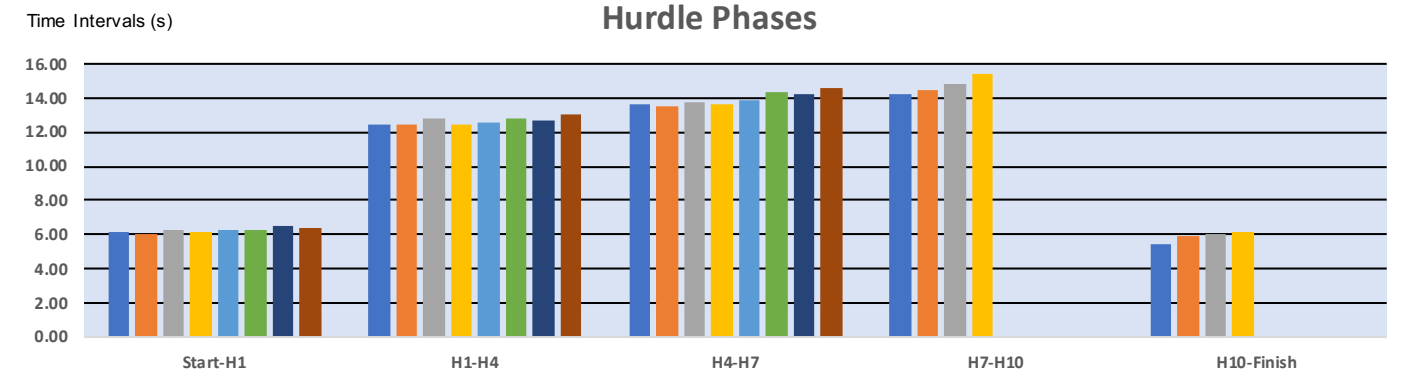
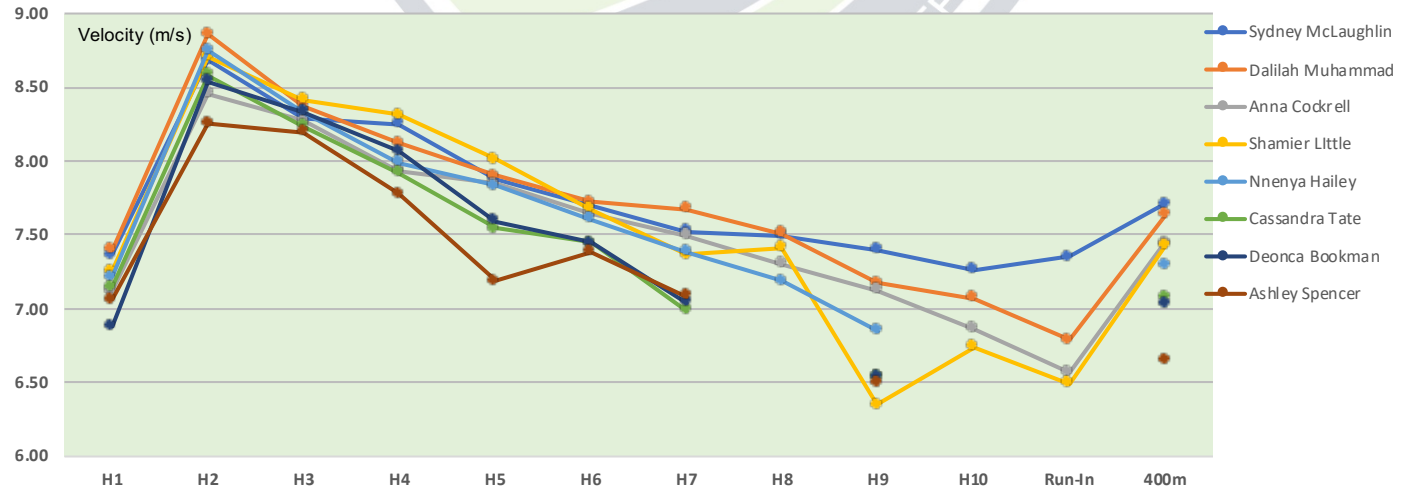
2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

Women's 400m Hurdles

Date 2021.06.27

FINAL

|  |               | H1    | H2    | H3    | H4    | H5    | H6    | H7    | H8    | H9    | H10   | Run-In | 400m  | Lane / Place | H1-H4 | H4-H7 | H7-H10 |
|--|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------|-------|-------|--------|
| <b>McLaughlin, Sydney (USA) (1999)</b> | time          | 6.11  | 10.14 | 14.36 | 18.60 | 23.04 | 27.59 | 32.24 | 36.91 | 41.64 | 46.46 |        | 51.90 | 6 / 1        |       |       |        |
|  | reaction time | 0.194 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval      |       | 4.03  | 4.22  | 4.24  | 4.44  | 4.55  | 4.65  | 4.67  | 4.73  | 4.82  | 5.44   | WR    |              | 12.49 | 13.64 | 14.22  |
|  | velocity      | 7.36  | 8.68  | 8.29  | 8.25  | 7.88  | 7.69  | 7.53  | 7.49  | 7.26  | 7.26  | 7.35   | 7.71  |              | 8.41  | 7.70  | 7.38   |
| H1 lead leg                            | R             |       |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
| <b>Muhammad, Dalilah (USA) (1990)</b>  | time          | 6.08  | 10.03 | 14.21 | 18.52 | 22.95 | 27.48 | 32.04 | 36.70 | 41.58 | 46.53 |        | 52.42 | 7 / 2        |       |       |        |
|  | reaction time | 0.167 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval      |       | 3.95  | 4.18  | 4.31  | 4.43  | 4.53  | 4.56  | 4.66  | 4.88  | 4.95  | 5.89   |       |              | 12.44 | 13.52 | 14.49  |
|  | velocity      | 7.40  | 8.86  | 8.37  | 8.12  | 7.90  | 7.73  | 7.68  | 7.51  | 7.17  | 7.07  | 6.79   | 7.63  |              | 8.44  | 7.77  | 7.25   |
| H1 lead leg                            | R             |       |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
| <b>Cockrell, Anna (USA) (1997)</b>     | time          | 6.32  | 10.46 | 14.69 | 19.10 | 23.56 | 28.14 | 32.81 | 37.60 | 42.51 | 47.61 |        | 53.70 | 9 / 3        |       |       |        |
|  | reaction time | 0.201 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval      |       | 4.14  | 4.23  | 4.41  | 4.46  | 4.58  | 4.67  | 4.79  | 4.91  | 5.10  | 6.09   | PB    |              | 12.78 | 13.71 | 14.80  |
|  | velocity      | 7.12  | 8.45  | 8.27  | 7.94  | 7.85  | 7.64  | 7.49  | 7.31  | 7.13  | 6.86  | 6.57   | 7.45  |              | 8.22  | 7.66  | 7.09   |
| H1 lead leg                            | L             |       |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
| <b>Little, Shamier (USA) (1995)</b>    | time          | 6.20  | 10.22 | 14.38 | 18.59 | 22.96 | 27.52 | 32.27 | 36.99 | 42.50 | 47.69 |        | 53.85 | 5 / 4        |       |       |        |
|  | reaction time | 0.213 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval      |       | 4.02  | 4.16  | 4.21  | 4.37  | 4.56  | 4.75  | 4.72  | 5.51  | 5.19  | 6.16   |       |              | 12.39 | 13.68 | 15.42  |
|  | velocity      | 7.26  | 8.71  | 8.41  | 8.31  | 8.01  | 7.68  | 7.37  | 7.42  | 6.35  | 6.74  | 6.49   | 7.43  |              | 8.47  | 7.68  | 6.81   |
| H1 lead leg                            | R             |       |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
| <b>Hailey, Nnenna (USA) (1994)</b>     | time          | 6.24  | 10.24 | 14.44 | 18.82 | 23.29 | 27.89 | 32.63 | 37.50 | 42.61 |       |        | 54.79 | 8 / 5        |       |       |        |
|  | reaction time | 0.251 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval      |       | 4.00  | 4.20  | 4.38  | 4.47  | 4.60  | 4.74  | 4.87  | 5.11  |       |        |       |              | 12.58 | 13.81 |        |
|  | velocity      | 7.21  | 8.75  | 8.33  | 7.99  | 7.83  | 7.61  | 7.38  | 7.19  | 6.85  |       |        | 7.30  |              | 8.35  | 7.60  |        |
| H1 lead leg                            | L             |       |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
| <b>Tate, Cassandra (USA) (1990)</b>    | time          | 6.30  | 10.38 | 14.63 | 19.05 | 23.69 | 28.39 | 33.40 |       | 44.11 |       |        | 56.51 | 4 / 5        |       |       |        |
|  | reaction time | 0.194 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval      |       | 4.08  | 4.25  | 4.42  | 4.64  | 4.70  | 5.01  |       | 10.71 |       |        |       |              | 12.75 | 14.35 |        |
|  | velocity      | 7.14  | 8.58  | 8.24  | 7.92  | 7.54  | 7.45  | 6.99  |       | 6.54  |       |        | 7.08  |              | 8.24  | 7.32  |        |
| H1 lead leg                            | R             |       |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
| <b>Bookman, Deonca (USA) (1995)</b>    | time          | 6.54  | 10.64 | 14.84 | 19.18 | 23.79 | 28.49 | 33.46 |       | 44.17 |       |        | 56.90 | 2 / 6        |       |       |        |
|  | reaction time | 0.349 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval      |       | 4.10  | 4.20  | 4.34  | 4.61  | 4.70  | 4.97  |       | 10.71 |       |        |       |              | 12.64 | 14.28 |        |
|  | velocity      | 6.88  | 8.54  | 8.33  | 8.06  | 7.59  | 7.45  | 7.04  |       | 6.54  |       |        | 7.03  |              | 8.31  | 7.35  |        |
| H1 lead leg                            | R             |       |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
| <b>Spencer, Ashley (USA) (1993)</b>    | time          | 6.37  | 10.61 | 14.88 | 19.38 | 24.25 | 28.99 | 33.93 |       | 44.71 |       |        | 60.19 | 3 / 7        |       |       |        |
|  | reaction time | 0.222 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval      |       | 4.24  | 4.27  | 4.50  | 4.87  | 4.74  | 4.94  |       | 10.78 |       |        |       |              | 13.01 | 14.55 |        |
|  | velocity      | 7.06  | 8.25  | 8.20  | 7.78  | 7.19  | 7.38  | 7.09  |       | 6.49  |       |        | 6.65  |              | 8.07  | 7.22  |        |
| H1 lead leg                            | L             |       |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |



1st-4th Place  
 Source: Athlete Tracking (2021.06.28). Women's 400mH - Unofficial Split Times.  
 Retrieved from <https://twitter.com/athleetracking/status/1409736538364260357?s=21>

5th-8th Place  
 Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 1920 x 1080 @ 30fps  
 Timing From: First Movement  
 Source: <https://www.youtube.com/watch?v=YiZ62VM5bqA>



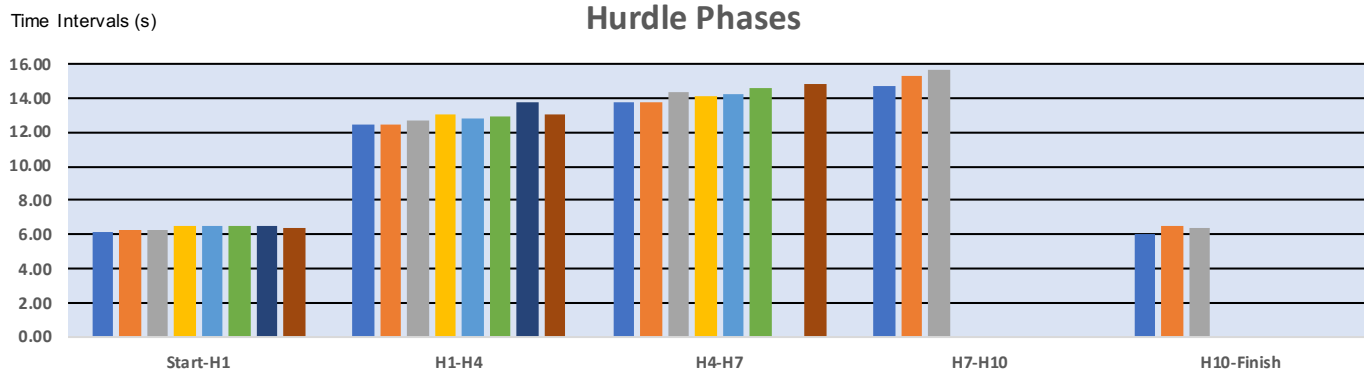
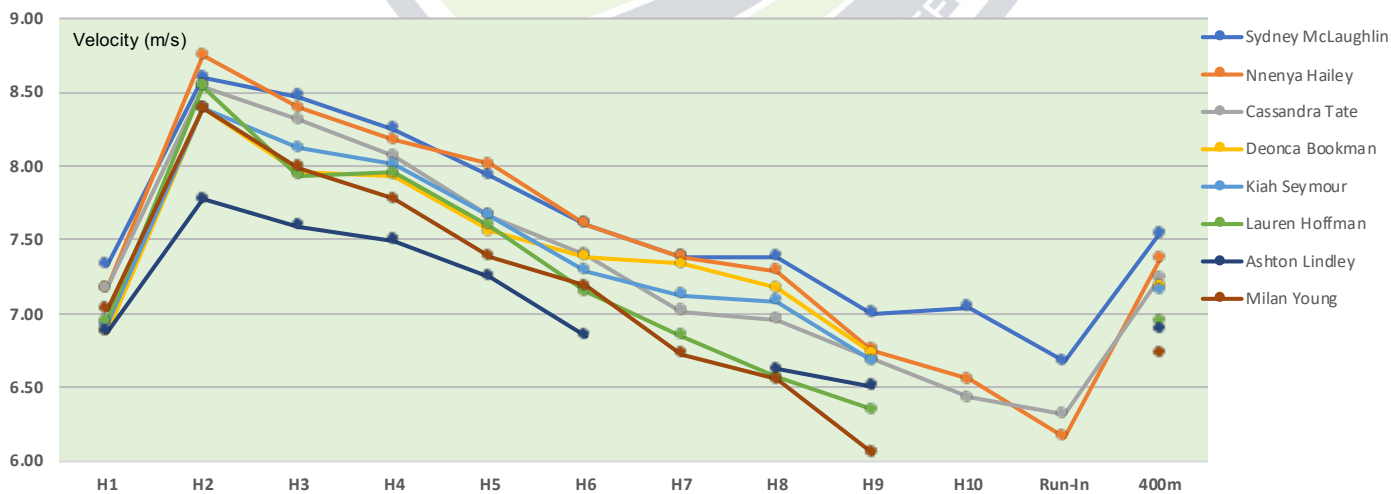
2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

Women's 400m Hurdles

Date 2021.06.26

Semi-Final 1

|  |                   | H1    | H2    | H3    | H4    | H5    | H6    | H7    | H8    | H9    | H10   | Run-In | 400m  | Lane / Place | H1-H4 | H4-H7 | H7-H10 |
|--|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------|-------|-------|--------|
| <b>McLaughlin, Sydney (USA) (1999)</b> | time              | 6.14  | 10.21 | 14.34 | 18.58 | 22.99 | 27.59 | 32.33 | 37.07 | 42.07 | 47.04 |        | 53.03 | 5 / 1        |       |       |        |
|  | reaction time     | 0.227 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval velocity | 7.33  | 8.60  | 8.47  | 8.25  | 7.94  | 7.61  | 7.38  | 7.00  | 7.04  | 6.68  | 7.54   |       |              | 12.44 | 13.75 | 14.71  |
| H1 lead leg                            | R                 | 22    | 14    | 14    | 14    | 14    | 15    | 15    | 15    | 16    | 15    | 18.2   | 172.2 |              | 8.44  | 7.64  | 7.14   |
| <b>Hailey, Nnenna (USA) (1994)</b>     | time              | 6.27  | 10.27 | 14.44 | 18.72 | 23.09 | 27.69 | 32.43 | 37.23 | 42.41 | 47.75 |        | 54.24 | 8 / 2        |       |       |        |
|  | reaction time     | 0.266 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval velocity | 7.18  | 8.75  | 8.39  | 8.18  | 8.01  | 7.61  | 7.38  | 7.29  | 6.76  | 6.55  | 6.16   | 7.37  |              | 12.45 | 13.71 | 15.32  |
| H1 lead leg                            | L                 | 16    | 16    | 16    | 15    | 16    | 17    | 17    | 17    | 18    | 18    | 22.5   | 172.5 |              | 8.43  | 7.66  | 6.85   |
| <b>Tate, Cassandra (USA) (1990)</b>    | time              | 6.27  | 10.37 | 14.58 | 18.92 | 23.49 | 28.22 | 33.21 | 38.24 | 43.47 | 48.91 |        | 55.24 | 6 / 3        |       |       |        |
|  | reaction time     | 0.211 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval velocity | 7.18  | 8.54  | 8.31  | 8.06  | 7.66  | 7.40  | 7.01  | 6.96  | 6.69  | 6.43  | 6.32   | 7.24  |              | 12.65 | 14.29 | 15.70  |
| H1 lead leg                            | R                 | 22    | 14    | 14    | 14    | 15    | 15    | 16    | 15    | 16    | 16    |        | 157   |              | 8.30  | 7.35  | 6.69   |
| <b>Bookman, Deonca (USA) (1995)</b>    | time              | 6.54  | 10.71 | 15.11 | 19.52 | 24.15 | 28.89 | 33.66 | 38.54 | 43.74 |       |        | 55.66 | 9 / 4        |       |       |        |
|  | reaction time     | 0.338 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval velocity | 6.88  | 8.39  | 7.95  | 7.94  | 7.56  | 7.38  | 7.34  | 7.17  | 6.73  |       |        |       |              | 12.98 | 14.14 |        |
| H1 lead leg                            | R                 | 17    | 17    | 17    | 17    | 17    | 17    | 17    | 17    | 18    | 18    |        | 155   |              | 8.09  | 7.43  |        |
| <b>Seymour, Kiah (USA) (1994)</b>      | time              | 6.50  | 10.67 | 14.98 | 19.35 | 23.92 | 28.72 | 33.63 | 38.57 | 43.81 |       |        | 55.84 | 7 / 5        |       |       |        |
|  | reaction time     | 0.204 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval velocity | 6.92  | 8.39  | 8.12  | 8.01  | 7.66  | 7.29  | 7.13  | 7.09  | 6.68  |       |        |       |              | 12.85 | 14.28 |        |
| H1 lead leg                            | R                 | 24    | 16    | 16    | 16    | 16    |       | 17    | 17    | 17    | 18    |        | 157   |              | 8.17  | 7.35  |        |
| <b>Hoffman, Lauren (USA) (1999)</b>    | time              | 6.47  | 10.57 | 14.98 | 19.38 | 23.99 | 28.89 | 34.00 | 39.33 | 44.84 |       |        | 57.59 | 3 / 6        |       |       |        |
|  | reaction time     | 0.224 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval velocity | 6.96  | 8.54  | 7.94  | 7.95  | 7.59  | 7.14  | 6.85  | 6.57  | 6.35  |       |        |       |              | 12.91 | 14.62 |        |
| H1 lead leg                            | L                 | 15    | 16    | 16    | 16    | 16    |       | 17    | 18    | 18    |       |        | 116   |              | 8.13  | 7.18  |        |
| <b>Lindley, Ashton (USA) (2002)</b>    | time              | 6.54  | 11.04 | 15.65 | 20.32 | 25.15 | 30.26 |       | 40.83 | 46.21 |       |        | 58.04 | 2 / 7        |       |       |        |
|  | reaction time     | 0.288 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval velocity | 6.88  | 7.78  | 7.59  | 7.49  | 7.25  | 6.85  |       | 6.62  | 6.51  |       |        |       |              | 13.78 |       |        |
| H1 lead leg                            | L                 | 16    | 16    | 16    | 16    | 16    |       |       | 17    |       |       |        | 81    |              | 7.62  |       |        |
| <b>Young, Milan (USA) (1999)</b>       | time              | 6.40  | 10.57 | 14.95 | 19.45 | 24.19 | 29.06 | 34.26 | 39.60 | 45.38 |       |        | 59.39 | 4 / 8        |       |       |        |
|  | reaction time     | 0.187 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval velocity | 7.03  | 8.39  | 7.99  | 7.78  | 7.38  | 7.19  | 6.73  | 6.55  | 6.06  |       |        |       |              | 13.05 | 14.81 |        |
| H1 lead leg                            | R                 | 22    | 15    | 15    | 15    | 15    |       | 16    | 16    | 17    |       |        | 131   |              | 8.05  | 7.09  |        |



Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 1920 x 1080 @ 30fps  
 Timing From: First Movement  
 Source: <https://www.youtube.com/watch?v=ZMxvKQ1hg18>

2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

Women's 400m Hurdles

Date 2021.06.25

Heat 4

|                                       |               | H1    | H2    | H3    | H4    | H5    | H6    | H7    | H8    | H9    | H10   | Run-In | 400m  | Lane / Place | H1-H4 | H4-H7 | H7-H10 |
|---------------------------------------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------|-------|-------|--------|
| <b>Muhammad, Dalilah (USA) (1990)</b> | time          | 6.03  | 10.06 | 14.40 | 18.80 | 23.40 | 28.13 | 33.10 | 38.30 | 43.60 | 49.03 |        | 55.51 | 3 / 1        |       |       |        |
|                                       | reaction time | 0.184 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|                                       | interval      |       | 4.03  | 4.34  | 4.40  | 4.60  | 4.73  | 4.97  | 5.20  | 5.30  | 5.43  | 6.48   |       |              | 12.77 | 14.30 | 15.93  |
|                                       | velocity      |       | 7.46  | 8.06  | 7.95  | 7.61  | 7.40  | 7.04  | 6.73  | 6.60  | 6.45  | 6.17   | 7.21  |              | 8.22  | 7.34  | 6.59   |
| H1 lead leg                           | R             |       | 15    | 15    | 15    | 15    | 15    | 15    | 15    | 16    | 16    | 19     | 178   |              |       |       |        |

Date 2021.06.25

Heat 3

|                                     |               | H1    | H2    | H3    | H4    | H5    | H6    | H7    | H8    | H9    | H10   | Run-In | 400m  | Lane / Place | H1-H4 | H4-H7 | H7-H10 |
|-------------------------------------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------|-------|-------|--------|
| <b>Tate, Cassandra (USA) (1990)</b> | time          | 6.36  | 10.43 | 14.80 | 19.36 | 24.00 | 28.70 | 33.60 | 38.90 | 44.26 | 49.75 |        | 56.11 | 2 / 1        |       |       |        |
|                                     | reaction time | 0.230 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|                                     | interval      |       | 4.07  | 4.37  | 4.56  | 4.64  | 4.70  | 4.90  | 5.30  | 5.36  | 5.49  | 6.36   |       |              | 13.00 | 14.24 | 16.15  |
|                                     | velocity      |       | 7.08  | 8.60  | 8.01  | 7.68  | 7.54  | 7.45  | 7.14  | 6.60  | 6.53  | 6.38   | 6.29  | 7.13         |       | 8.08  | 7.37   |
| H1 lead leg                         | R             |       | 14    | 14    | 15    | 15    | 15    | 15    | 16    | 16    | 16    | 19.2   | 155.2 |              |       |       |        |

Date 2021.06.25

Heat 2

|                                     |               | H1    | H2    | H3    | H4    | H5    | H6    | H7    | H8    | H9    | H10   | Run-In | 400m  | Lane / Place | H1-H4 | H4-H7 | H7-H10 |
|-------------------------------------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------|-------|-------|--------|
| <b>Little, Shamier (USA) (1995)</b> | time          | 6.53  | 10.80 | 15.16 | 19.66 | 24.30 | 29.06 | 33.93 | 38.76 | 43.86 | 49.10 |        | 55.22 | 7 / 1        |       |       |        |
|                                     | reaction time | 0.301 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|                                     | interval      |       | 4.27  | 4.36  | 4.50  | 4.64  | 4.76  | 4.87  | 4.83  | 5.10  | 5.24  | 6.12   |       |              | 13.13 | 14.27 | 15.17  |
|                                     | velocity      |       | 6.89  | 8.20  | 8.03  | 7.78  | 7.54  | 7.35  | 7.19  | 7.25  | 6.86  | 6.68   | 6.54  | 7.24         |       | 8.00  | 7.36   |
| H1 lead leg                         | R             |       | 15    | 15    | 15    | 16    | 16    | 16    | 16    | 16    | 16    | 19     | 183   |              |       |       |        |

Date 2021.06.25

Heat 1

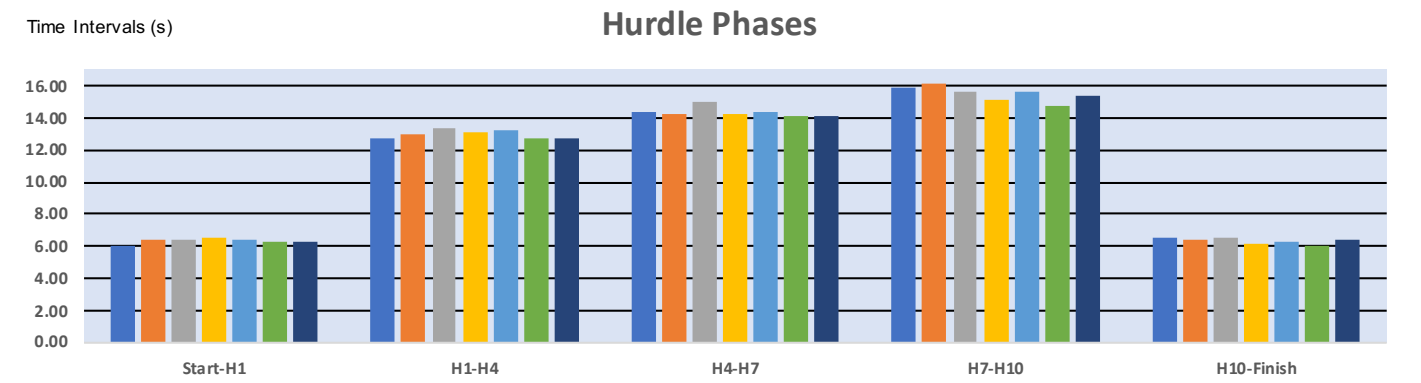
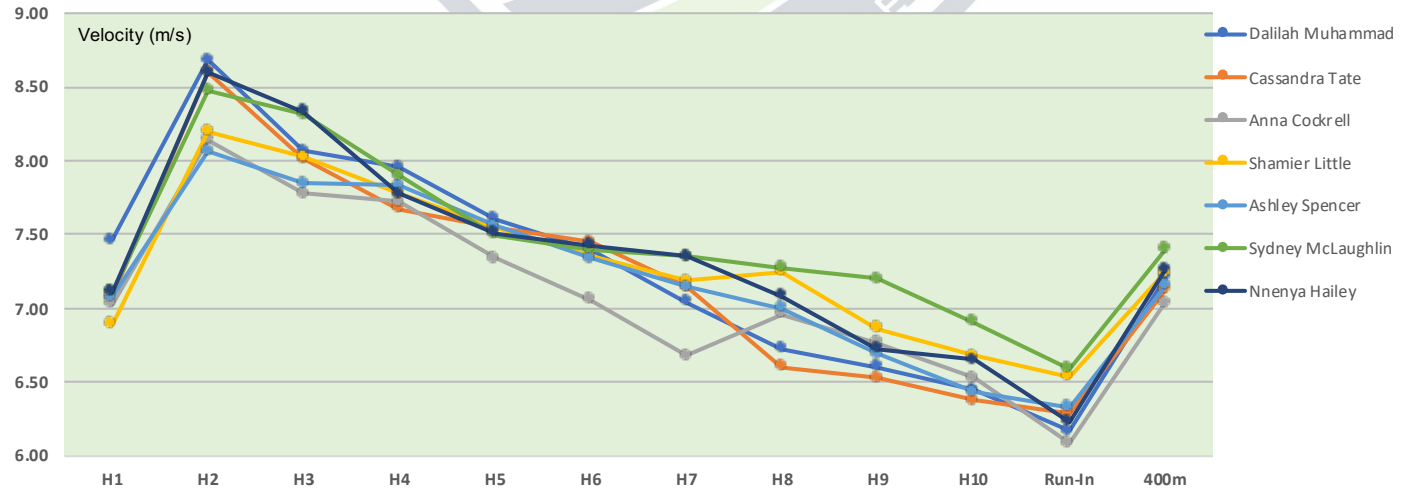
|                                     |               | H1    | H2    | H3    | H4    | H5    | H6    | H7    | H8    | H9    | H10   | Run-In | 400m  | Lane / Place | H1-H4 | H4-H7 | H7-H10 |
|-------------------------------------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------|-------|-------|--------|
| <b>Spencer, Ashley (USA) (1993)</b> | time          | 6.36  | 10.70 | 15.16 | 19.63 | 24.26 | 29.03 | 33.93 | 38.93 | 44.16 | 49.60 |        | 55.92 | 8 / 2        |       |       |        |
|                                     | reaction time | 0.182 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|                                     | interval      |       | 4.34  | 4.46  | 4.47  | 4.63  | 4.77  | 4.90  | 5.00  | 5.23  | 5.44  | 6.32   |       |              | 13.27 | 14.30 | 15.67  |
|                                     | velocity      |       | 7.08  | 8.06  | 7.85  | 7.83  | 7.56  | 7.34  | 7.14  | 7.00  | 6.69  | 6.43   | 6.33  | 7.15         |       | 7.91  | 7.34   |
| H1 lead leg                         | L             |       | 15    | 15    | 15    | 15    | 15    | 15    | 15    | 15    | 15    | 18     | 175   |              |       |       |        |

Date 2021.06.25

Heat 1

|  |               | H1    | H2    | H3    | H4    | H5    | H6    | H7    | H8    | H9    | H10   | Run-In | 400m  | Lane / Place | H1-H4 | H4-H7 | H7-H10 |
|--|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------|-------|-------|--------|
| <b>McLaughlin, Sydney (USA) (1999)</b> | time          | 6.33  | 10.46 | 14.67 | 19.10 | 23.77 | 28.50 | 33.26 | 38.07 | 42.93 | 48.00 |        | 54.07 | 5 / 1        |       |       |        |
|  | reaction time | 0.255 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|  | interval      |       | 4.13  | 4.21  | 4.43  | 4.67  | 4.73  | 4.76  | 4.81  | 4.86  | 5.07  | 6.07   |       |              | 12.77 | 14.16 | 14.74  |
|  | velocity      |       | 7.11  | 8.47  | 8.31  | 7.90  | 7.49  | 7.40  | 7.35  | 7.28  | 7.20  | 6.90   | 6.59  | 7.40         |       | 8.22  | 7.42   |
| H1 lead leg                            | R             |       | 14    | 14    | 15    | 15    | 15    | 15    | 15    | 15    | 16    | 18.2   | 174.2 |              |       |       |        |

|                                    |               | H1    | H2    | H3    | H4    | H5    | H6    | H7    | H8    | H9    | H10   | Run-In | 400m  | Lane / Place | H1-H4 | H4-H7 | H7-H10 |
|------------------------------------|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------|-------|-------|--------|
| <b>Hailey, Nnenna (USA) (1994)</b> | time          | 6.33  | 10.40 | 14.60 | 19.10 | 23.76 | 28.47 | 33.23 | 38.17 | 43.37 | 48.63 |        | 55.05 | 8 / 2        |       |       |        |
|                                    | reaction time | 0.291 |       |       |       |       |       |       |       |       |       |        |       |              |       |       |        |
|                                    | interval      |       | 4.07  | 4.20  | 4.50  | 4.66  | 4.71  | 4.76  | 4.94  | 5.20  | 5.26  | 6.42   |       |              | 12.77 | 14.13 | 15.40  |
|                                    | velocity      |       | 7.11  | 8.60  | 8.33  | 7.78  | 7.51  | 7.43  | 7.35  | 7.09  | 6.73  | 6.65   | 6.23  | 7.27         |       | 8.22  | 7.43   |
| H1 lead leg                        | L             |       | 16    | 16    | 17    | 17    | 17    | 17    | 17    | 18    | 18    | 22.2   | 175.2 |              |       |       |        |



Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 1920 x 1080 @ 30fps  
 Timing From: First Movement  
 Source: <https://www.youtube.com/watch?v=0hAEK8AeHsk&t=95s>

Biomechanical Analysis

2021 Music City Track Carnival (Nashville, TN) (TV Analysis)

Women's 400m Hurdles

Date 2021.06.06

FINAL

|                                 |               | H1      | H2       | H3    | H4    | H5    | H6    | H7    | H8    | H9    | H10   | Run-In | 400m  | Lane / Place | H1-H4 | H4-H7 | H7-H10 |
|---------------------------------|---------------|---------|----------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------|-------|-------|--------|
| McLaughlin, Sydney (USA) (1999) | time          | 6.34    | 10.64    | 14.88 | 19.07 | 23.45 | 27.92 | 32.53 | 37.34 | 42.44 | 47.48 |        | 52.83 | 5 / 1        |       |       |        |
|                                 | reaction time |         | interval | 4.30  | 4.24  | 4.19  | 4.38  | 4.47  | 4.61  | 4.81  | 5.10  | 5.04   | 5.35  |              | 12.73 | 13.46 | 14.95  |
|                                 | velocity      | 7.10    | 8.14     | 8.25  | 8.35  | 7.99  | 7.99  | 7.83  | 7.59  | 7.28  | 6.86  | 6.94   | 7.57  |              | 8.25  | 7.80  | 7.02   |
| H1 lead leg                     | R             | strides | 22       | 15    | 14    | 14    | 14    | 14    | 15    |       | 16    | 16     | 18.5  |              |       |       |        |

2019 IAAF World Championships (Doha, QAT)

Date 2021.06.06

FINAL

|                                 |               | H1      | H2       | H3    | H4    | H5    | H6    | H7    | H8    | H9    | H10   | Run-In | 400m  | Lane / Place | H1-H4 | H4-H7 | H7-H10 |
|---------------------------------|---------------|---------|----------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------|-------|-------|--------|
| McLaughlin, Sydney (USA) (1999) | time          | 6.27    | 10.27    | 14.38 | 18.65 | 22.98 | 27.42 | 31.96 | 36.73 | 41.57 | 46.58 |        | 52.23 | 4 / 2        |       |       |        |
|                                 | reaction time | 0.161   | interval | 4.00  | 4.11  | 4.27  | 4.33  | 4.44  | 4.54  | 4.77  | 4.84  | 5.01   | 5.65  |              | 12.38 | 13.31 | 14.62  |
|                                 | velocity      | 7.18    | 8.75     | 8.52  | 8.20  | 8.08  | 7.88  | 7.71  | 7.34  | 7.23  | 6.99  | 7.08   | 7.66  |              | 8.48  | 7.89  | 7.18   |
| H1 lead leg                     | R             | strides | 23       | 15    | 15    | 15    | 15    | 15    | 16    | 16    | 16    | 19.2   | 180.2 |              |       |       |        |

2018 South Eastern Conference Championships (Knoxville, TN) (TV Analysis)

Date 2018.05.13

FINAL

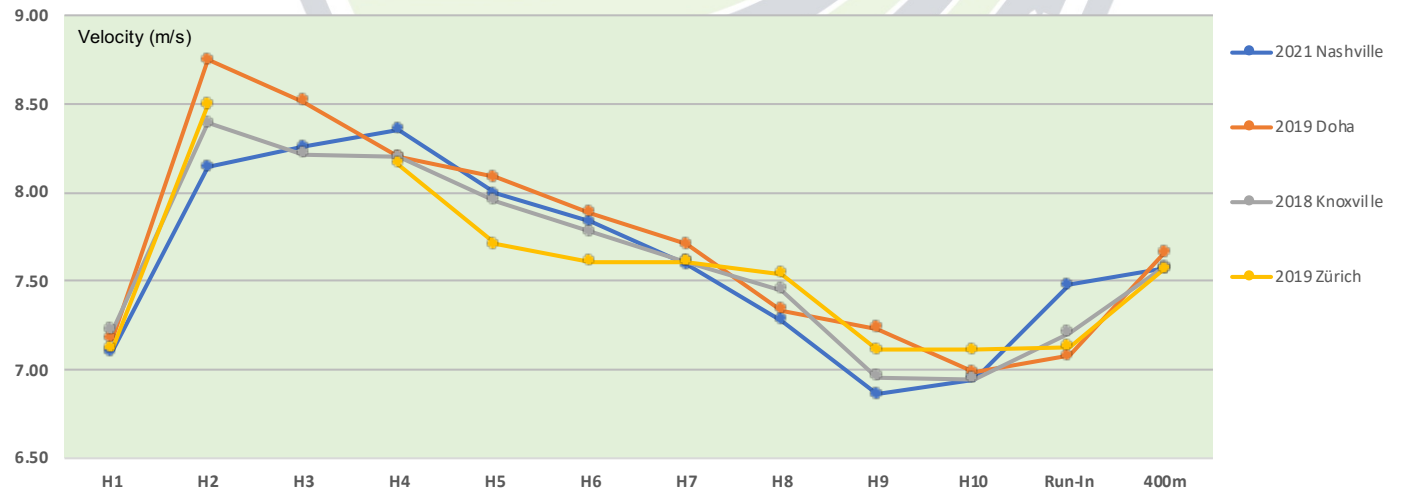
|                                 |               | H1      | H2       | H3    | H4    | H5    | H6    | H7    | H8    | H9    | H10   | Run-In | 400m  | Lane / Place | H1-H4 | H4-H7 | H7-H10 |
|---------------------------------|---------------|---------|----------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------|-------|-------|--------|
| McLaughlin, Sydney (USA) (1999) | time          | 6.23    | 10.40    | 14.66 | 18.93 | 23.33 | 27.83 | 32.43 | 37.13 | 42.16 | 47.20 |        | 52.75 | 5 / 1        |       |       |        |
|                                 | reaction time |         | interval | 4.17  | 4.26  | 4.27  | 4.40  | 4.50  | 4.60  | 4.70  | 5.03  | 5.04   | 5.55  |              | 12.70 | 13.50 | 14.77  |
|                                 | velocity      | 7.22    | 8.39     | 8.22  | 8.20  | 7.95  | 7.78  | 7.61  | 7.45  | 6.96  | 6.94  | 7.21   | 7.58  |              | 8.27  | 7.78  | 7.11   |
| H1 lead leg                     | R             | strides | 15       | 15    | 15    | 15    | 15    | 15    | 15    | 16    | 16    | 18.5   | 155.5 |              |       |       |        |

2019 Weltklasse (Zürich, SUI) (TV Analysis)

Date 2018.05.13

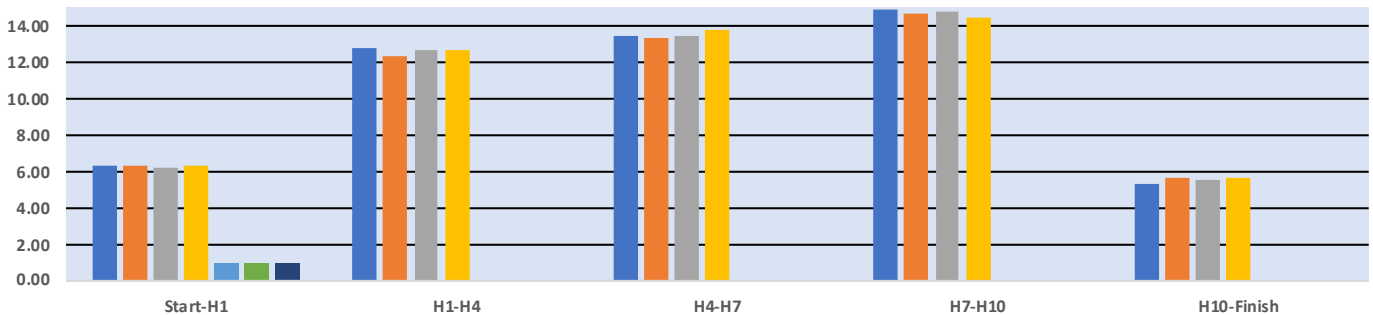
FINAL

|                                 |               | H1      | H2       | H3 | H4    | H5    | H6    | H7    | H8    | H9    | H10   | Run-In | 400m  | Lane / Place | H1-H4 | H4-H7 | H7-H10 |
|---------------------------------|---------------|---------|----------|----|-------|-------|-------|-------|-------|-------|-------|--------|-------|--------------|-------|-------|--------|
| McLaughlin, Sydney (USA) (1999) | time          | 6.32    | 10.44    |    | 19.02 | 23.56 | 28.16 | 32.76 | 37.40 | 42.32 | 47.24 |        | 52.85 | 3 / 1        |       |       |        |
|                                 | reaction time | 0.147   | interval |    | 8.58  | 4.54  | 4.60  | 4.60  | 4.64  | 4.92  | 4.92  | 5.61   |       |              | 12.70 | 13.74 | 14.48  |
|                                 | velocity      | 7.12    | 8.50     |    | 8.16  | 7.71  | 7.61  | 7.61  | 7.54  | 7.11  | 7.11  | 7.13   | 7.57  |              | 8.27  | 7.64  | 7.25   |
| H1 lead leg                     | R             | strides | 23       | 15 |       | 15    | 15    | 15    | 15    | 16    | 16    | 19     | 149   |              |       |       |        |



Time Intervals (s)

Hurdle Phases



2021 ATL Music City Track Carnival

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=Xi0evM1wU0g>

2018 South Eastern Conference Championships

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=DRlu2cpfIMc>

2019 IAAF World Championships (Doha, QAT)

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: [https://www.youtube.com/watch?v=ZAz0GS\\_4QTY](https://www.youtube.com/watch?v=ZAz0GS_4QTY)

2019 Weltklasse (Zürich, SUI)

Evaluated with: ObjectusVideo

Quality & Frame Rate: 1280 x 720 @ 25fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=poeeZDX--3Q>

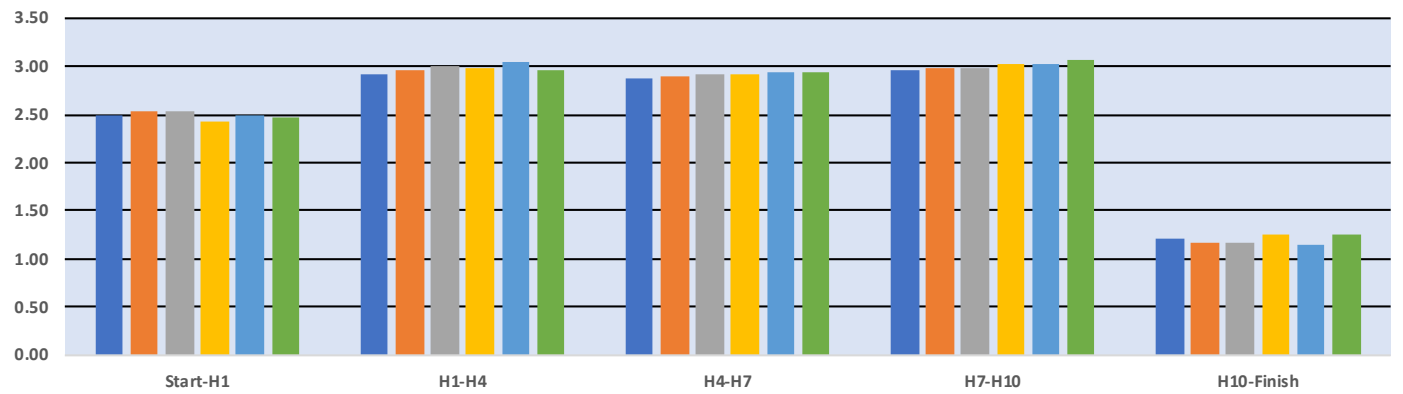
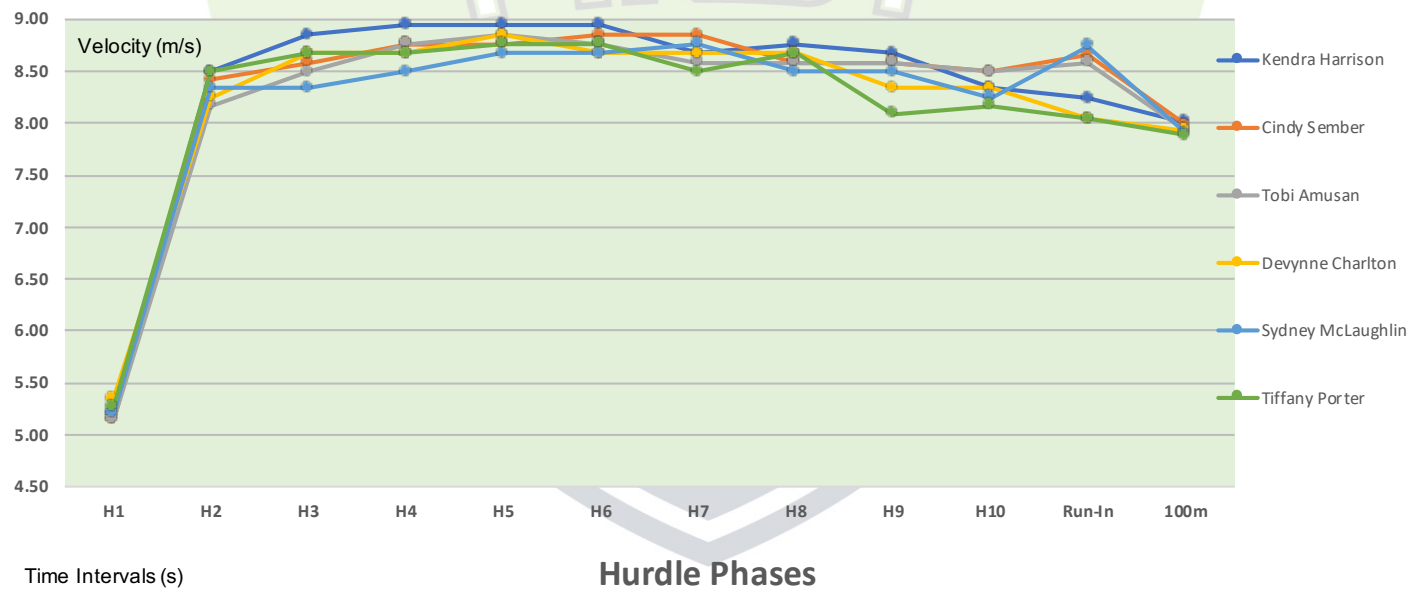
2021 USATF Golden Games (Walnut, CA) (TV Analysis)

100m Hurdles

Date: 2021.05.09 Wind: 2.0 m/s

FINAL

|                                 |               | H1    | H2   | H3   | H4   | H5   | H6   | H7   | H8   | H9    | H10   | Run-In | 100m  | Lane/Place | H1-H4 | H4-H7 | H7-H10 |
|---------------------------------|---------------|-------|------|------|------|------|------|------|------|-------|-------|--------|-------|------------|-------|-------|--------|
| Harrison, Kendra (USA) (1992)   | time          | 2.50  | 3.50 | 4.46 | 5.41 | 6.36 | 7.31 | 8.29 | 9.26 | 10.24 | 11.26 |        | 12.48 | 4 / 1      |       |       |        |
|                                 | reaction time | 0.185 |      |      |      |      |      |      |      |       |       |        |       |            | 2.91  | 2.88  | 2.97   |
|                                 | interval      |       | 1.00 | 0.96 | 0.95 | 0.95 | 0.95 | 0.98 | 0.97 | 0.98  | 1.02  | 1.22   |       |            | 8.76  | 8.85  | 8.59   |
|                                 | velocity      | 5.20  | 8.50 | 8.85 | 8.95 | 8.95 | 8.95 | 8.67 | 8.76 | 8.67  | 8.33  | 8.24   | 8.01  |            |       |       |        |
| Sember, Cindy (GBR) (1994)      | time          | 2.53  | 3.54 | 4.53 | 5.50 | 6.47 | 7.43 | 8.39 | 9.38 | 10.37 | 11.37 |        | 12.53 | 3 / 2      |       |       |        |
|                                 | reaction time | 0.173 |      |      |      |      |      |      |      |       |       |        |       |            | 2.97  | 2.89  | 2.98   |
|                                 | interval      |       | 1.01 | 0.99 | 0.97 | 0.97 | 0.96 | 0.96 | 0.99 | 0.99  | 1.00  | 1.16   |       |            | 8.59  | 8.82  | 8.56   |
|                                 | velocity      | 5.14  | 8.42 | 8.59 | 8.76 | 8.76 | 8.85 | 8.85 | 8.59 | 8.59  | 8.50  | 8.66   | 7.98  |            |       |       |        |
| Amusan, Tobi (NGR) (1997)       | time          | 2.53  | 3.57 | 4.57 | 5.54 | 6.50 | 7.47 | 8.46 | 9.45 | 10.44 | 11.44 |        | 12.61 | 7 / 3      |       |       |        |
|                                 | reaction time | 0.172 |      |      |      |      |      |      |      |       |       |        |       |            | 3.01  | 2.92  | 2.98   |
|                                 | interval      |       | 1.04 | 1.00 | 0.97 | 0.96 | 0.97 | 0.99 | 0.99 | 0.99  | 1.00  | 1.17   |       |            | 8.47  | 8.73  | 8.56   |
|                                 | velocity      | 5.14  | 8.17 | 8.50 | 8.76 | 8.85 | 8.76 | 8.59 | 8.59 | 8.59  | 8.50  | 8.59   | 7.93  |            |       |       |        |
| Charlton, Devynne (BAH) (1995)  | time          | 2.43  | 3.46 | 4.44 | 5.42 | 6.38 | 7.36 | 8.34 | 9.32 | 10.34 | 11.36 |        | 12.61 | 1 / 4      |       |       |        |
|                                 | reaction time | 0.147 |      |      |      |      |      |      |      |       |       |        |       |            | 2.99  | 2.92  | 3.02   |
|                                 | interval      |       | 1.03 | 0.98 | 0.98 | 0.96 | 0.98 | 0.98 | 0.98 | 1.02  | 1.02  | 1.25   |       |            | 8.53  | 8.73  | 8.44   |
|                                 | velocity      | 5.35  | 8.25 | 8.67 | 8.67 | 8.85 | 8.67 | 8.67 | 8.67 | 8.33  | 8.33  | 8.04   | 7.93  |            |       |       |        |
| McLaughlin, Sydney (USA) (1999) | time          | 2.50  | 3.52 | 4.54 | 5.54 | 6.52 | 7.50 | 8.47 | 9.47 | 10.47 | 11.50 |        | 12.65 | 2 / 5      |       |       |        |
|                                 | reaction time | 0.175 |      |      |      |      |      |      |      |       |       |        |       |            | 3.04  | 2.93  | 3.03   |
|                                 | interval      |       | 1.02 | 1.02 | 1.00 | 0.98 | 0.98 | 0.97 | 1.00 | 1.00  | 1.03  | 1.15   |       |            | 8.39  | 8.70  | 8.42   |
|                                 | velocity      | 5.20  | 8.33 | 8.33 | 8.50 | 8.67 | 8.67 | 8.76 | 8.50 | 8.50  | 8.25  | 8.74   | 7.91  |            |       |       |        |
| Porter, Tiffany (GBR) (1987)    | time          | 2.47  | 3.47 | 4.45 | 5.43 | 6.40 | 7.37 | 8.37 | 9.35 | 10.40 | 11.44 |        | 12.69 | 5 / 6      |       |       |        |
|                                 | reaction time | 0.156 |      |      |      |      |      |      |      |       |       |        |       |            | 2.96  | 2.94  | 3.07   |
|                                 | interval      |       | 1.00 | 0.98 | 0.98 | 0.97 | 0.97 | 1.00 | 0.98 | 1.05  | 1.04  | 1.25   |       |            | 8.61  | 8.67  | 8.31   |
|                                 | velocity      | 5.26  | 8.50 | 8.67 | 8.67 | 8.76 | 8.76 | 8.50 | 8.67 | 8.10  | 8.17  | 8.04   | 7.88  |            |       |       |        |



Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 1920 x 1080 @ 30fps  
 Timing From: First Movement  
 Source: [https://www.youtube.com/watch?v=mrg\\_-49zHXw](https://www.youtube.com/watch?v=mrg_-49zHXw)



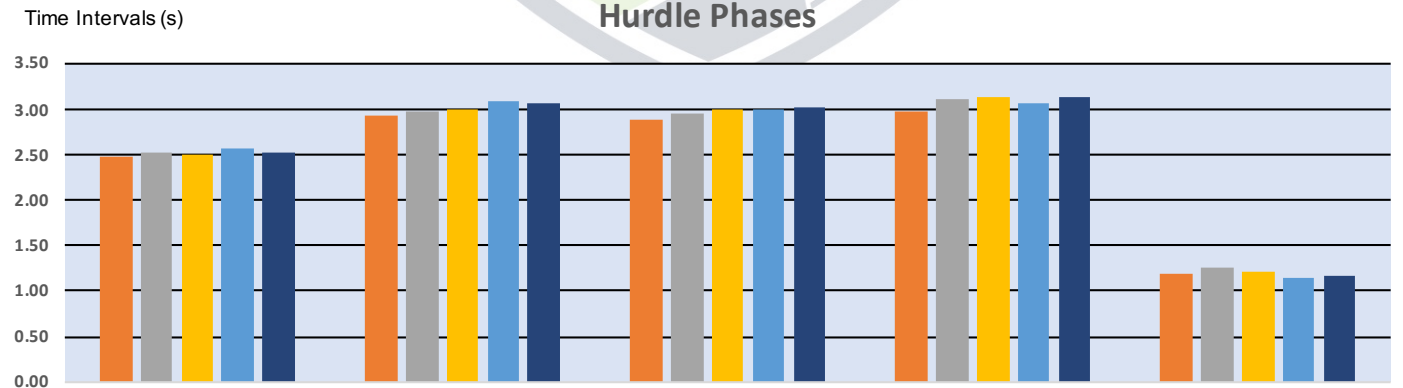
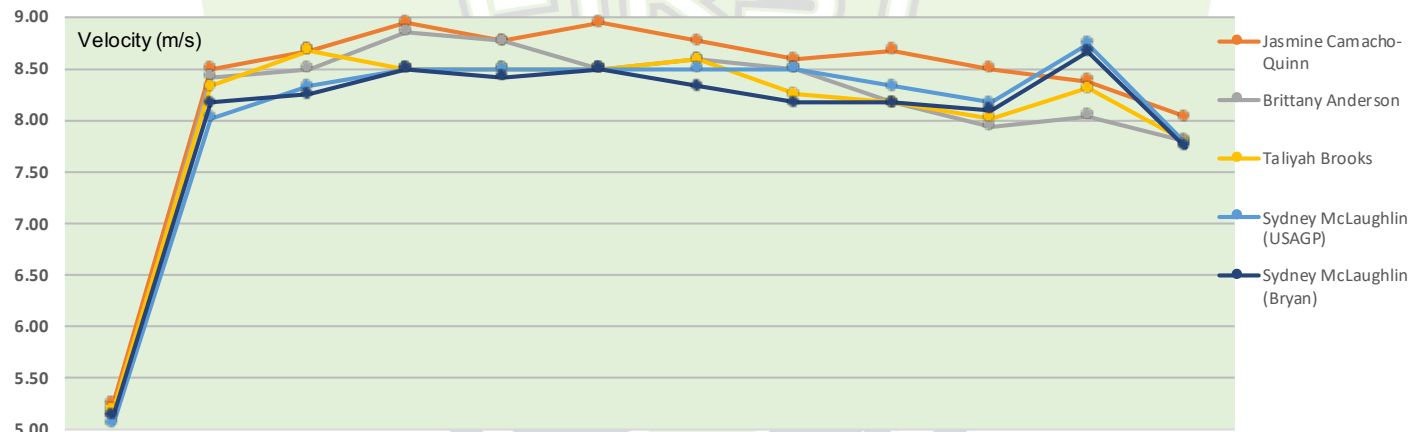
Biomechanical Analysis

2021 USATF Grand Prix (Eugene, OR) (TV Analysis)

|                                    |               | Date: 2021.04.24 |      |      |      |      |      |      |      |       |       | Wind: -0.3 m/s |       |            | FINAL |       |        |
|------------------------------------|---------------|------------------|------|------|------|------|------|------|------|-------|-------|----------------|-------|------------|-------|-------|--------|
|                                    |               | H1               | H2   | H3   | H4   | H5   | H6   | H7   | H8   | H9    | H10   | Run-In         | 100m  | Lane/Place | H1-H4 | H4-H7 | H7-H10 |
| Camacho-Quinn, Jasmine (PUR) (199) | time          | 2.47             | 3.47 | 4.45 | 5.40 | 6.37 | 7.32 | 8.29 | 9.28 | 10.26 | 11.26 | 12.46          | 12.46 | 5 / 1      |       |       |        |
|                                    | reaction time |                  |      |      |      |      |      |      |      |       |       |                |       |            | 2.93  | 2.89  | 2.97   |
|                                    | interval      | 1.00             | 1.00 | 0.98 | 0.95 | 0.97 | 0.95 | 0.97 | 0.99 | 0.98  | 1.00  | 1.20           | 8.03  |            | 8.70  | 8.82  | 8.59   |
|                                    | velocity      | 5.26             | 8.50 | 8.67 | 8.95 | 8.76 | 8.95 | 8.76 | 8.59 | 8.67  | 8.50  | 8.37           | 8.03  |            |       |       |        |
| Anderson, Brittany (JAM) (2001)    | time          | 2.53             | 3.54 | 4.54 | 5.50 | 6.47 | 7.47 | 8.46 | 9.46 | 10.50 | 11.57 | 12.82          | 12.82 | 8 / 2      |       |       |        |
|                                    | reaction time |                  |      |      |      |      |      |      |      |       |       |                |       |            | 2.97  | 2.96  | 3.11   |
|                                    | interval      | 1.01             | 1.00 | 0.96 | 0.97 | 1.00 | 0.99 | 1.00 | 1.00 | 1.04  | 1.07  | 1.25           | 7.80  |            | 8.59  | 8.61  | 8.20   |
|                                    | velocity      | 5.14             | 8.42 | 8.50 | 8.85 | 8.76 | 8.50 | 8.59 | 8.50 | 8.17  | 7.94  | 8.04           | 7.80  |            |       |       |        |
| Brooks, Taliyah (USA) (1995)       | time          | 2.50             | 3.52 | 4.50 | 5.50 | 6.50 | 7.50 | 8.49 | 9.52 | 10.56 | 11.62 | 12.83          | 12.83 | 6 / 3      |       |       |        |
|                                    | reaction time |                  |      |      |      |      |      |      |      |       |       |                |       |            | 3.00  | 2.99  | 3.13   |
|                                    | interval      | 7 steps          | 1.02 | 0.98 | 1.00 | 1.00 | 1.00 | 0.99 | 1.03 | 1.04  | 1.06  | 1.21           | 7.79  |            | 8.50  | 8.53  | 8.15   |
|                                    | velocity      | 5.20             | 8.33 | 8.67 | 8.50 | 8.50 | 8.50 | 8.59 | 8.25 | 8.17  | 8.02  | 8.31           | 7.79  |            |       |       |        |
| McLaughlin, Sydney (USA) (1999)    | time          | 2.57             | 3.63 | 4.65 | 5.65 | 6.65 | 7.65 | 8.65 | 9.65 | 10.67 | 11.71 | 12.86          | 12.86 | 2 / 4      |       |       |        |
|                                    | reaction time |                  |      |      |      |      |      |      |      |       |       |                |       |            | 3.08  | 3.00  | 3.06   |
|                                    | interval      | 7 steps          | 1.06 | 1.02 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.02  | 1.04  | 1.15           | PB    |            | 8.28  | 8.50  | 8.33   |
|                                    | velocity      | 5.06             | 8.02 | 8.33 | 8.50 | 8.50 | 8.50 | 8.50 | 8.50 | 8.33  | 8.17  | 8.74           | 7.78  |            |       |       |        |

2021 Bryan Clay Invitational (Azusa, CA) (TV Analysis)

|                                 |               | Date: 2021.04.16 |      |      |      |      |      |      |      |       |       | Wind: 0.2 m/s |       |            | FINAL |       |        |
|---------------------------------|---------------|------------------|------|------|------|------|------|------|------|-------|-------|---------------|-------|------------|-------|-------|--------|
|                                 |               | H1               | H2   | H3   | H4   | H5   | H6   | H7   | H8   | H9    | H10   | Run-In        | 100m  | Lane/Place | H1-H4 | H4-H7 | H7-H10 |
| McLaughlin, Sydney (USA) (1999) | time          | 2.53             | 3.57 | 4.60 | 5.60 | 6.61 | 7.61 | 8.63 | 9.67 | 10.71 | 11.76 | 12.92         | 12.92 | 4 / 1      |       |       |        |
|                                 | reaction time |                  |      |      |      |      |      |      |      |       |       |               |       |            | 3.07  | 3.03  | 3.13   |
|                                 | interval      | 7 steps          | 1.04 | 1.03 | 1.00 | 1.01 | 1.01 | 1.00 | 1.02 | 1.04  | 1.04  | 1.05          | 1.16  | PB         | 8.31  | 8.42  | 8.15   |
|                                 | velocity      | 5.14             | 8.17 | 8.25 | 8.50 | 8.42 | 8.50 | 8.33 | 8.17 | 8.17  | 8.10  | 8.66          | 7.74  |            |       |       |        |



USATF Grand Prix  
 Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 1920 x 1080 @ 30fps  
 Timing From: First Movement  
 Source: <https://www.youtube.com/watch?v=Z1emR0y6sw0>

Bryan Clay Invitational  
 Evaluated with: ObjectusVideo  
 Quality & Frame Rate: 1920 x 1080 @ 30fps  
 Timing From: First Movement  
 Source: <https://www.youtube.com/watch?v=MXxaq179KQ4>