

2021 Women's 400m Hurdles World Record Season

Sydney McLaughlin (USA) - 51.46

Hurdle Touchdown Times



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Todd Henson

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Meetings Overview:

Sydney McLaughlin Season Overview	3
2020 Olympic Games (Tokyo, JPN) (TV Analysis) — Final	5
2020 Olympic Games (Tokyo, JPN) (TV Analysis) — Semi-Finals, Heats	6
2020 USA Olympic Trials (Eugene, OR) — Final	7
2020 USA Olympic Trials (Eugene, OR) (TV Analysis) — Semi-Final 1	8
2020 USA Olympic Trials (Eugene, OR) (TV Analysis) — Heats	9
Music City Track Carnival (Nashville, TN) (TV Analysis) — Final	10
USATF Golden Grand Games (Walnut, CA) (100m Hurdles) (TV Analysis)— Final	11
USATF Golden Grand Prix (Eugene, OR) (100m Hurdles) (TV Analysis)— Final	12
Brian Clay Invitational (Azusa, CA) (100m Hurdles) (TV Analysis)— Final	12

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 ± 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 ± 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.

2021 Women's 400m Hurdles World Record Season - McLaughlin, Sydney (USA) (1999)

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

FINAL date 04-Aug-21 *Henson (2021) - Athlete First: 2021 year end hurdle report*

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (199)	time	6.16	10.16	14.24	18.36	22.64	27.00	31.56	36.32	41.20	46.04		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	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	strides	22	14	14	14	14	14	15	16	15	18.5	170.5				

Semi-Final 2 date 02-Aug-21 *Henson (2021) - Athlete First: 2021 year end hurdle report*

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (199)	time	6.20	10.20	14.32	18.52	22.88	27.52	32.24	37.04	42.04	47.20		53.03	5 / 1			
	reaction time	0.204	interval	4.00	4.12	4.20	4.36	4.64	4.72	4.80	5.00	5.16	5.83		12.32	13.72	14.96
	velocity	7.26	8.75	8.50	8.33	8.03	7.54	7.42	7.29	7.00	6.78	6.86	7.54		8.52	7.65	7.02
H1 lead leg	R	strides	22	14	14	14	14	15	15	15	16	16	173.5				

Heat 3 date 31-Jul-21 *Henson (2021) - Athlete First: 2021 year end hurdle report*

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (199)	time	6.36	10.52	14.80	19.26	23.80	28.56	33.48	38.44	43.58	48.74		54.65	5 / 1			
	reaction time	0.180	interval	4.16	4.28	4.46	4.54	4.76	4.92	4.96	5.14	5.16	5.91		12.90	14.22	15.26
	velocity	7.08	8.41	8.18	7.85	7.71	7.35	7.11	7.06	6.81	6.78	6.77	7.32		8.14	7.38	6.88
H1 lead leg	R	strides	22	14	14	14	15	15	15	16	16	18.5	173.5				

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

FINAL date 27-Jun-21 *Henson (2021) - Athlete First: 2021 year end hurdle report*

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (199)	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	4.73	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	7.40	7.26	7.35	7.71		8.41	7.70	7.38
H1 lead leg	R	strides	22	14	14	14	15	15	15	15	15	18.2	171.2				

Semi-Final 1 date 26-Jun-21 *Henson (2021) - Athlete First: 2021 year end hurdle report*

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (199)	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	4.07	4.13	4.24	4.41	4.60	4.74	5.00	4.97	5.99	7.54		12.44	13.75	14.71
	velocity	7.33	8.60	8.47	8.25	7.94	7.61	7.38	7.38	7.00	7.04	6.68	7.54		8.44	7.64	7.14
H1 lead leg	R	strides	22	14	14	14	15	15	15	16	15	18.2	172.2				

Heat 1 date 25-Jun-21 *Henson (2021) - Athlete First: 2021 year end hurdle report*

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (199)	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	7.12
H1 lead leg	R	strides	22	14	14	15	15	15	15	15	16	18.2	174.2				

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

FINAL date 06-Jun-21 *Henson (2021) - Athlete First: 2021 year end hurdle report*

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (199)	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	7.57		12.73	13.46	14.95
	velocity	7.10	8.14	8.25	8.35	7.99	7.83	7.59	7.28	6.86	6.94	7.48	7.57		8.25	7.80	7.02
H1 lead leg	R	strides	22	15	14	14	14	15	15	16	16	18.5	158.5				

2021 USATF Golden Games (Walnut, CA)

FINAL date 09-May-21 *Henson (2021) - Athlete First: 2021 Sydney McLaughlin 400m hurdles world record season*

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (199)	time	2.50	3.52	4.54	5.54	6.52	7.50	8.47	9.47	10.47	11.50		12.65	2 / 4			
	reaction time	0.175	interval	7 steps	1.02	1.00	0.98	0.97	1.00	1.00	1.03	1.15	PB		3.04	2.93	3.03
	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		8.39	8.70	8.42

Heat 2 date 09-May-21 *Henson (2021) - Athlete First: 2021 Sydney McLaughlin 400m hurdles world record season*

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (199)	time												12.90	/ 5			
	reaction time	0.216	interval	No Information Available										7.75			
	velocity																

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

FINAL date 24-Apr-21 *Henson (2021) - Athlete First: 2021 year end hurdle report*

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (199)	time	2.57	3.63	4.65	5.65	6.65	7.65	8.65	9.65	10.67	11.71		12.86	2 / 4			
	reaction time	interval	7 steps	1.06	1.02	1.00	1.00	1.00	1.00	1.02	1.04	1.15	PB		3.08	3.00	3.06
	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		8.28	8.50	8.33

2021 Brian Clay Invitational (Azusa, CA)

Heat 2 date 16-Apr-21 *Henson (2021) - Athlete First: 2021 Sydney McLaughlin 400m hurdles world record season*

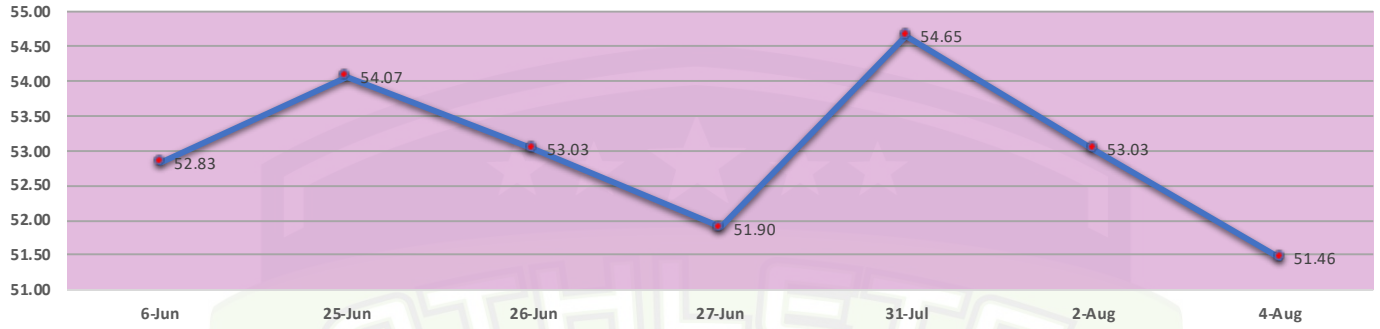
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10	
McLaughlin, Sydney (USA) (199)	time	2.53	3.57	4.60	5.60	6.61	7.61	8.63	9.67	10.71	11.76		12.92	4 / 1				
	reaction time	interval	7 steps	1.04	1.03	1.00	1.01	1.00	1.02	1.04	1.04	1.05	1.16	PB		3.07	3.03	3.13
	velocity	5.14	8.17	8.25	8.50	8.42	8.50	8.33	8.17	8.17	8.10	8.66	7.74		8.31	8.42	8.15	

2021 GCU Antelope Invitational (Phoenix, AZ)

FINAL date 03-Apr-21 *Henson (2021) - Athlete First: 2021 year end hurdle report*

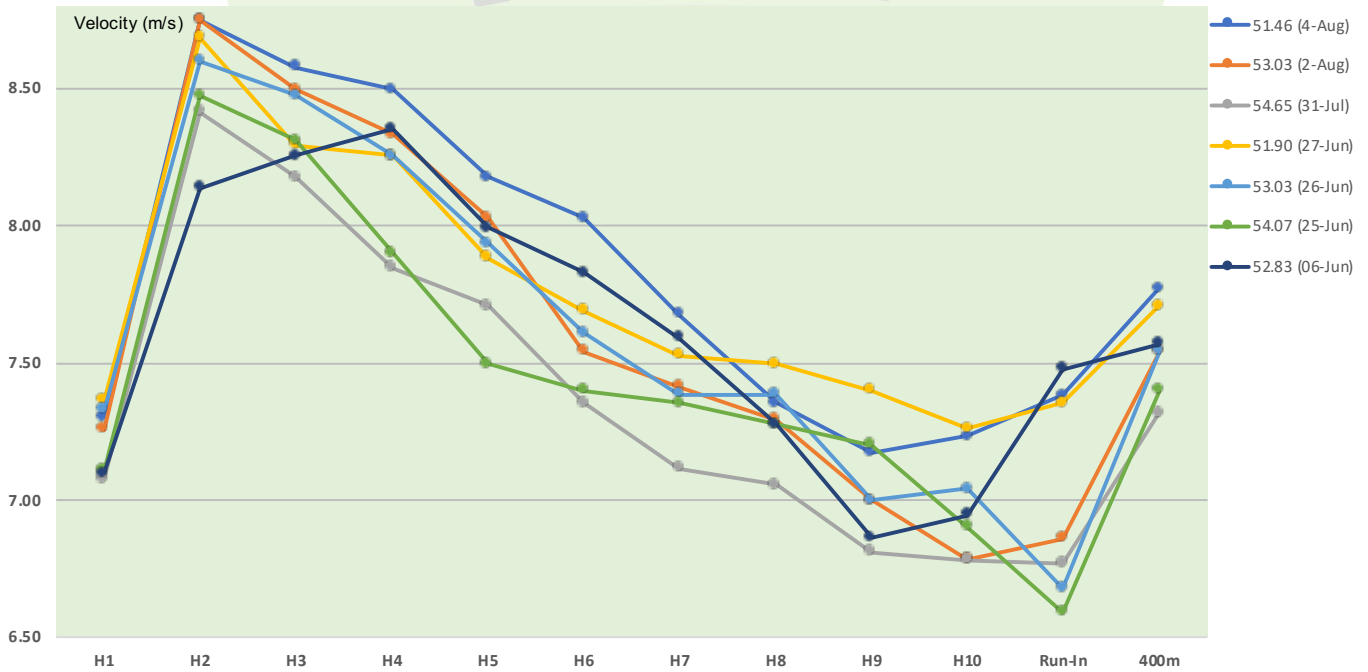
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	Official Time	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (199)	time												13.03	/ 1			
	reaction time	interval	No Information Available										PB				
	velocity													7.67			

Sydney McLaughlin 2021



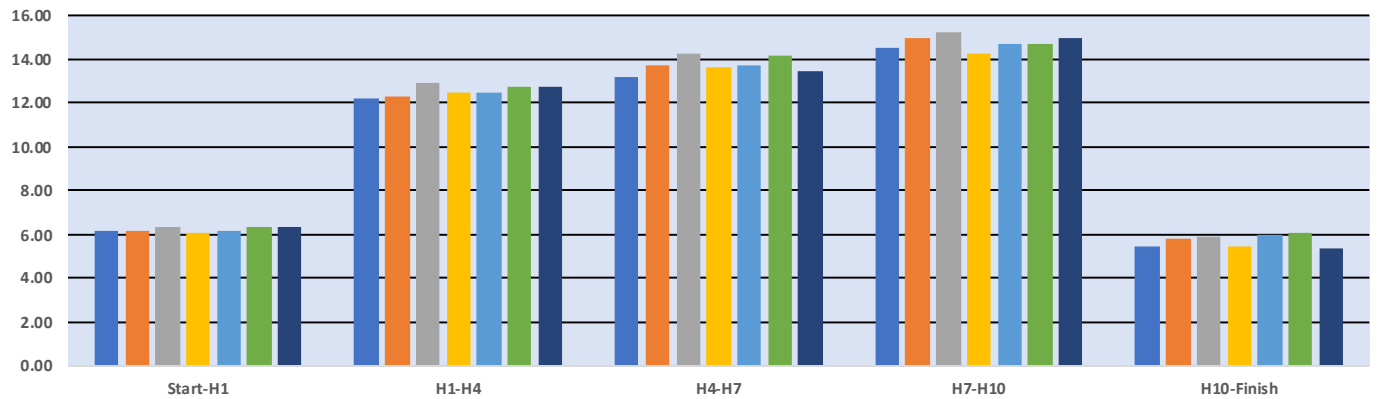
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Hurdle Rhythmic Units



Time Intervals (s)

Hurdle Phases



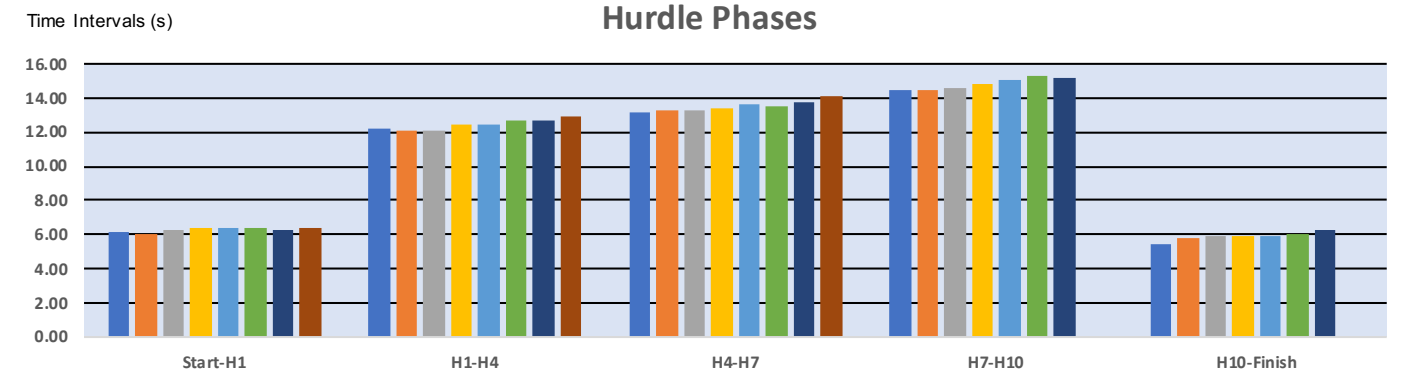
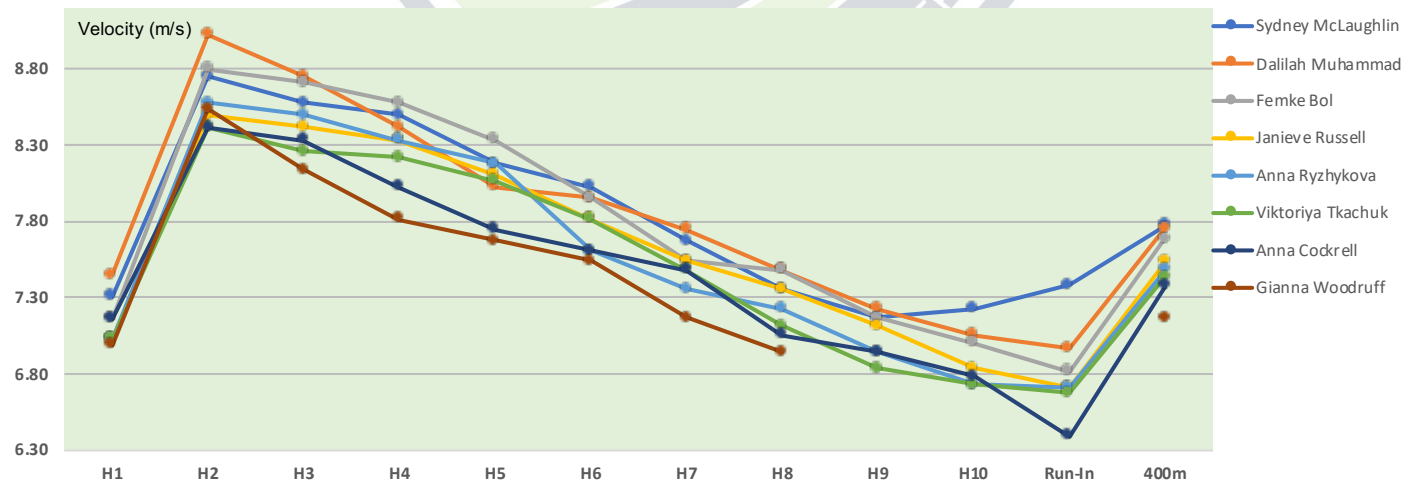
2020 Olympic Games (Tokyo, JPN) (TV Analysis)

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
McLaughlin, Sydney (USA) (1999)	time	6.16	10.16	14.24	18.36	22.64	27.00	31.56	36.32	41.20	46.04		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			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				
Muhammad, Dalilah (USA) (1990)	time	6.04	9.92	13.92	18.08	22.44	26.84	31.36	36.04	40.88	45.84		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			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					
Bol, Femke (NED) (2000)	time	6.28	10.26	14.28	18.36	22.56	26.96	31.60	36.28	41.16	46.16		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			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					
Russell, Janieve (JAM) (1993)	time	6.40	10.52	14.68	18.88	23.20	27.68	32.32	37.08	42.00	47.12		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			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					
Ryzhykova, Anna (UKR) (1989)	time	6.40	10.48	14.60	18.80	23.08	27.68	32.44	37.28	42.32	47.52		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					
Tkachuk, Viktoriya (UKR) (1994)	time	6.40	10.56	14.80	19.06	23.40	27.88	32.56	37.48	42.60	47.80		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			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					
Cockrell, Anna (USA) (1997)	time	6.28	10.44	14.64	19.00	23.52	28.12	32.80	37.76	42.80	47.96		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			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					
Woodruff, Gianna (PAN) (1993)	time	6.44	10.54	14.84	19.32	23.88	28.52	33.40	38.44				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				7.16		12.88	14.08	
H1 lead leg	L											128		8.15	7.46		



Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 25fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=-BT0qOqSR-k>

Biomechanical Analysis

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

Women's 400m Hurdles

Date 2021.07.31

Heat 5

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Muhammad, Dalilah (USA) (1990)	time												53.97		0.00	0.00	0.00
	reaction time	0.189											0.74	7.41	#DIV/0!	#DIV/0!	#DIV/0!
	interval																
	velocity																
H1 lead leg	R																

Date 2021.07.31

Heat 4

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Bol, Femke (NED) (2000)	time												54.43		0.00	0.00	0.00
	reaction time	0.194											0.73	7.35	#DIV/0!	#DIV/0!	#DIV/0!
	interval																
	velocity																
H1 lead leg	L																

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
McLaughlin, Sydney (USA) (1999)	time	6.36	10.52	14.80	19.26	23.80	28.56	33.48	38.44	43.58	48.74		54.65	5 / 1			
	reaction time	0.176													12.90	14.22	15.26
	interval		4.16	4.28	4.46	4.54	4.76	4.92	4.96	5.14	5.16	5.91			8.14	7.38	6.88
	velocity		7.08	8.41	8.18	7.85	7.71	7.35	7.11	7.06	6.81	6.78	6.77	7.32			
H1 lead leg	R																
		22	14	14	14	14	15	15	15	16	16	18.5	173.5				

Women's 400m Hurdles

Date 2021.08.02

Semi-Final 3

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Bol, Femke (NED) (2000)	time	6.48	10.60	14.76	19.04	23.40	27.92	32.56	37.32	42.24	47.32		53.91	5 / 1			
	reaction time	0.215													12.56	13.52	14.76
	interval		4.12	4.16	4.28	4.36	4.52	4.64	4.76	4.92	5.08	6.59			8.36	7.77	7.11
	velocity		6.94	8.50	8.41	8.18	8.03	7.74	7.54	7.35	7.11	6.89	6.07	7.42			
H1 lead leg	L																
		22	15	15	15	15	15	15	15	15	15	19	176				

Date 2021.08.02

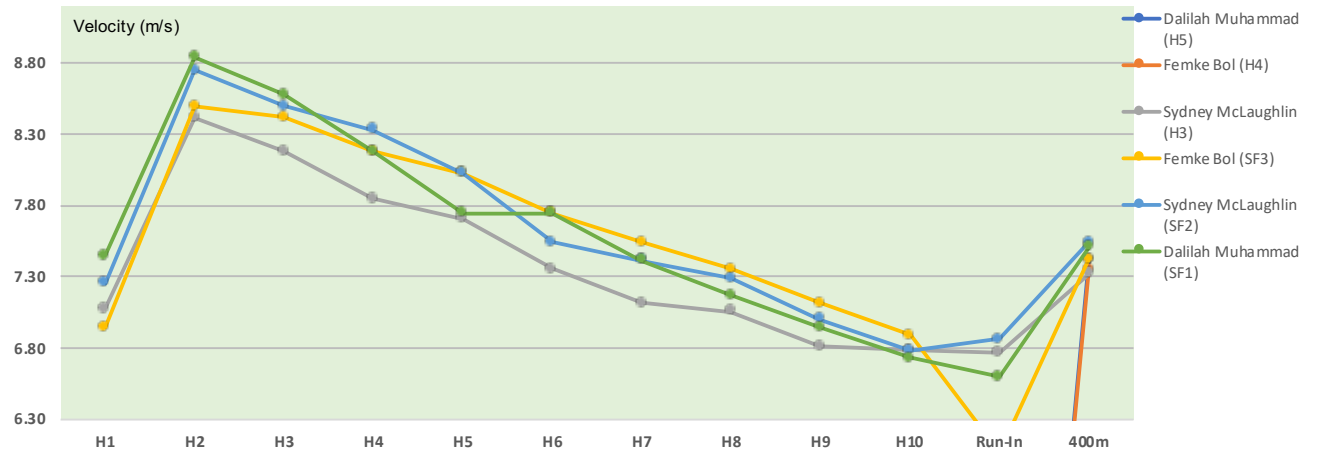
Semi-Final 2

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (1999)	time	6.20	10.20	14.32	18.52	22.88	27.52	32.24	37.04	42.04	47.20		53.03	5 / 1			
	reaction time	0.204													12.32	13.72	14.96
	interval		4.00	4.12	4.20	4.36	4.52	4.64	4.72	4.80	5.00	5.16	5.83		8.52	7.65	7.02
	velocity		7.26	8.75	8.50	8.33	8.03	7.54	7.42	7.29	7.00	6.78	6.86	7.54			
H1 lead leg	R																
		22	14	14	14	14	15	15	15	16	16	18.5	173.5				

Date 2021.08.02

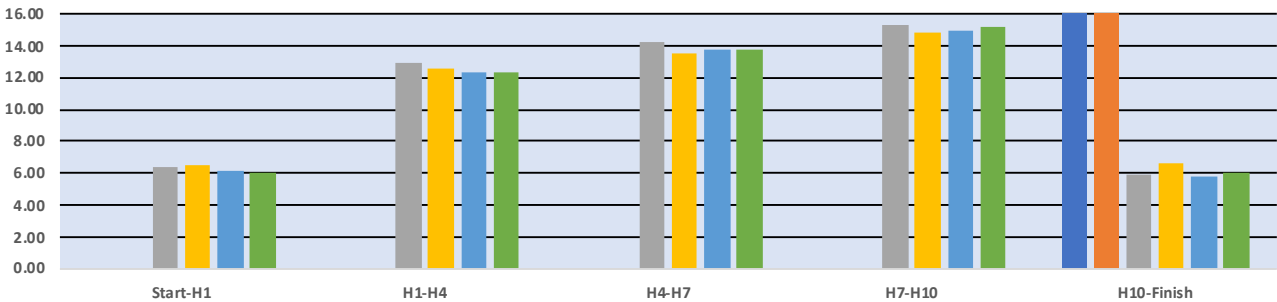
Semi-Final 1

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Muhammad, Dalilah (USA) (1990)	time	6.04	10.00	14.08	18.36	22.88	27.40	32.12	37.00	42.04	47.24		53.30	7 / 1			
	reaction time	0.186													12.32	13.76	15.12
	interval		3.96	4.08	4.28	4.52	4.52	4.72	4.88	5.04	5.20	6.06			8.52	7.63	6.94
	velocity		7.45	8.84	8.58	8.18	7.74	7.74	7.42	7.17	6.94	6.73	6.60	7.50			
H1 lead leg	R																
		22	15	15	15	15	15	15	15	16	16	19	178				



Time Intervals (s)

Hurdle Phases



Olympic Games - Semi-Finals

Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 25fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=9YHpol277Qw>

Olympic Games - Heat 3

Evaluated with: ObjectusVideo
 Quality & Frame Rate: 1920 x 1080 @ 24fps
 Timing From: First Movement
 Source: <https://www.youtube.com/watch?v=mB1ng0Lz4HY&t=4s>

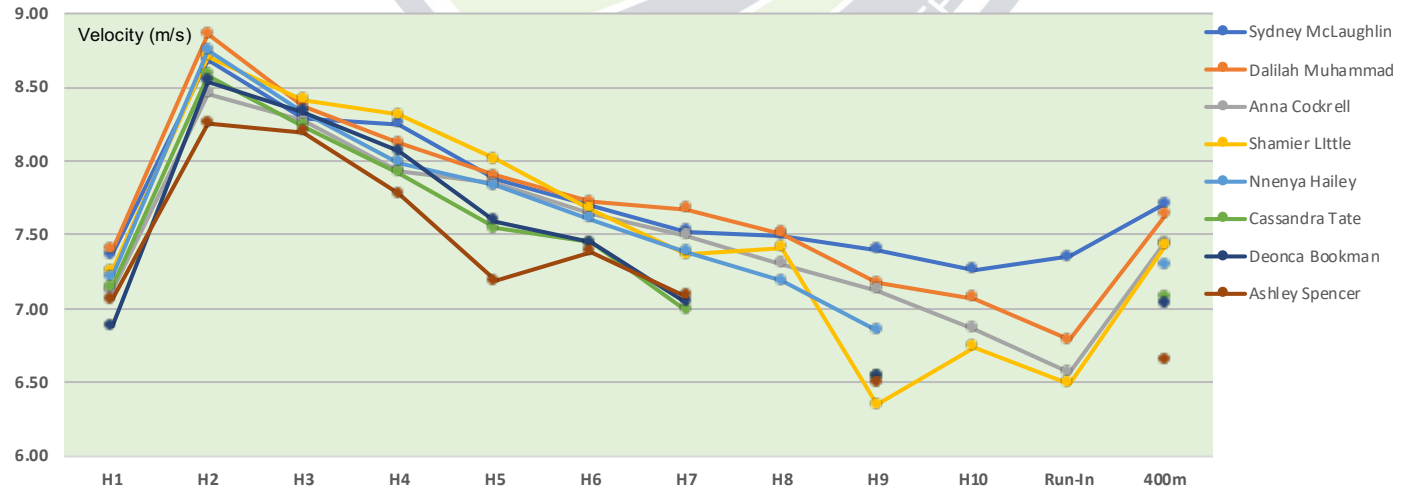
2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

Women's 400m Hurdles

Date 2021.06.27

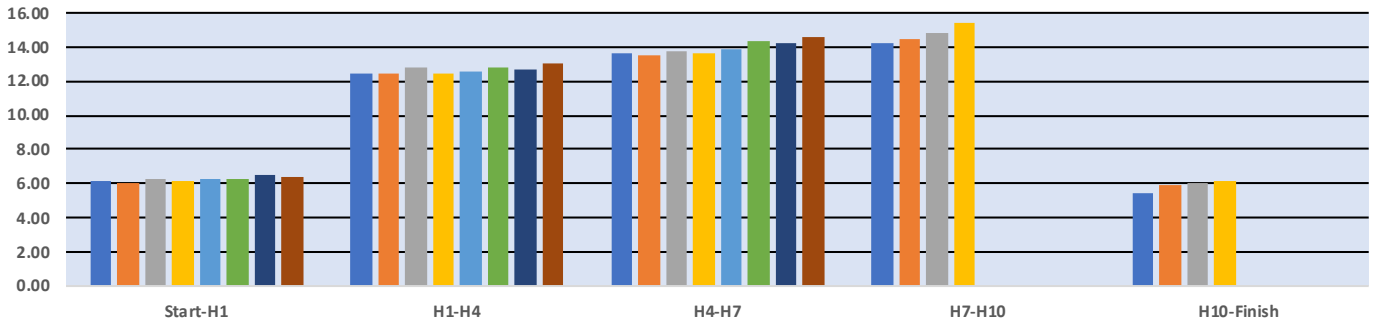
FINAL

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (1999)	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																
Muhammad, Dalilah (USA) (1990)	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																
Cockrell, Anna (USA) (1997)	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																
Little, Shamier (USA) (1995)	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																
Hailey, Nnenna (USA) (1994)	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																
Tate, Cassandra (USA) (1990)	time	6.30	10.38	14.63	19.05	23.69	28.39	33.40		44.11			56.51	4 / 6-5			
	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																
Bookman, Deonca (USA) (1995)	time	6.54	10.64	14.84	19.18	23.79	28.49	33.46		44.17			56.90	2 / 7-6			
	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																
Spencer, Ashley (USA) (1993)	time	6.37	10.61	14.88	19.38	24.25	28.99	33.93		44.71			60.19	3 / 8-7			
	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																



Time Intervals (s)

Hurdle Phases



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>

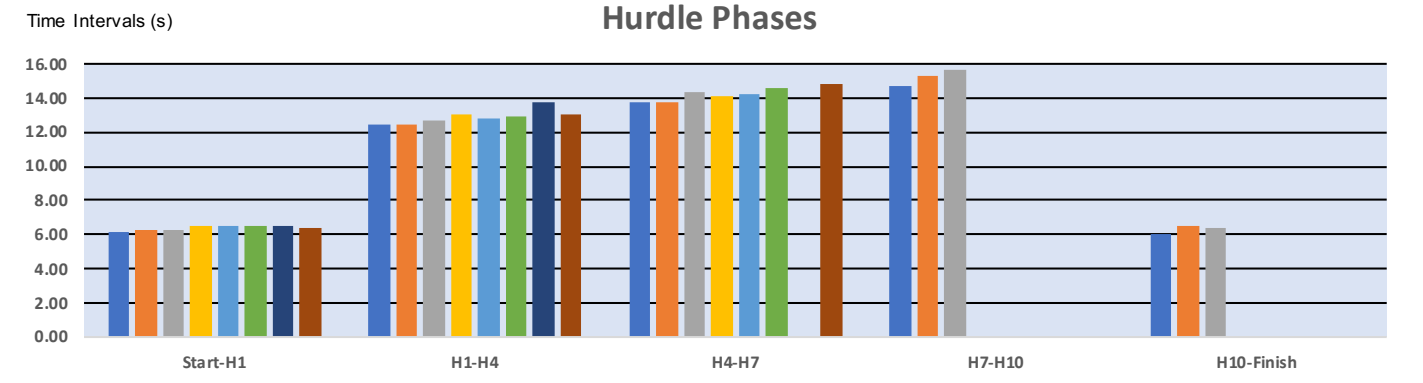
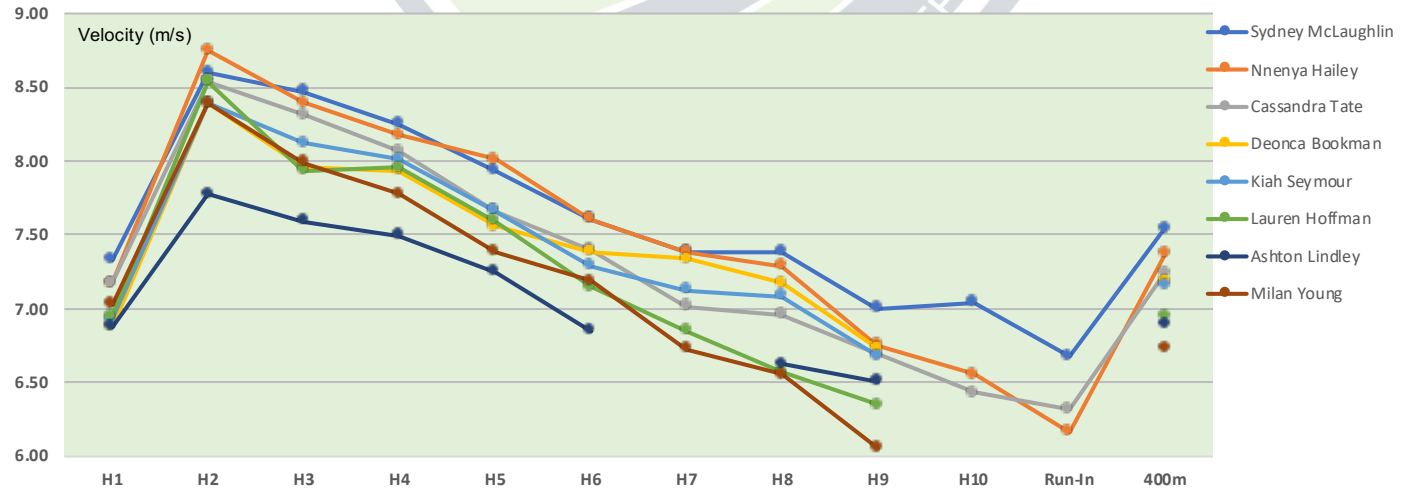
2020 USA Olympic Trials (Eugene, OR) (TV Analysis)

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
McLaughlin, Sydney (USA) (1999)	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
Hailey, Nnenna (USA) (1994)	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
Tate, Cassandra (USA) (1990)	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
Bookman, Deonca (USA) (1995)	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	
Seymour, Kiah (USA) (1994)	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	
Hoffman, Lauren (USA) (1999)	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	
Lindley, Ashton (USA) (2002)	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		
Young, Milan (USA) (1999)	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
Muhammad, Dalilah (USA) (1990)	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	8.06	7.95	7.61	7.40	7.04	6.73	6.60	6.45	6.17	7.21		8.22	7.34
H1 lead leg	R		strides	22	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
Tate, Cassandra (USA) (1990)	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		strides	14	14	15	15	15	16	16	16	19.2	155.2				
Cockrell, Anna (USA) (1997)	time	6.40	10.70	15.20	19.73	24.50	29.46	34.70	39.73	44.90	50.26		56.83	7 / 2			
	reaction time	0.196															
	interval		4.30	4.50	4.53	4.77	4.96	5.24	5.03	5.17	5.36	6.57			13.33	14.97	15.56
	velocity		7.03	8.14	7.78	7.73	7.34	7.06	6.68	6.96	6.77	6.53	6.09	7.04		7.88	7.01
H1 lead leg	L		strides	22	15	15	15	15	16	15	16	16	20	180			

Date 2021.06.25

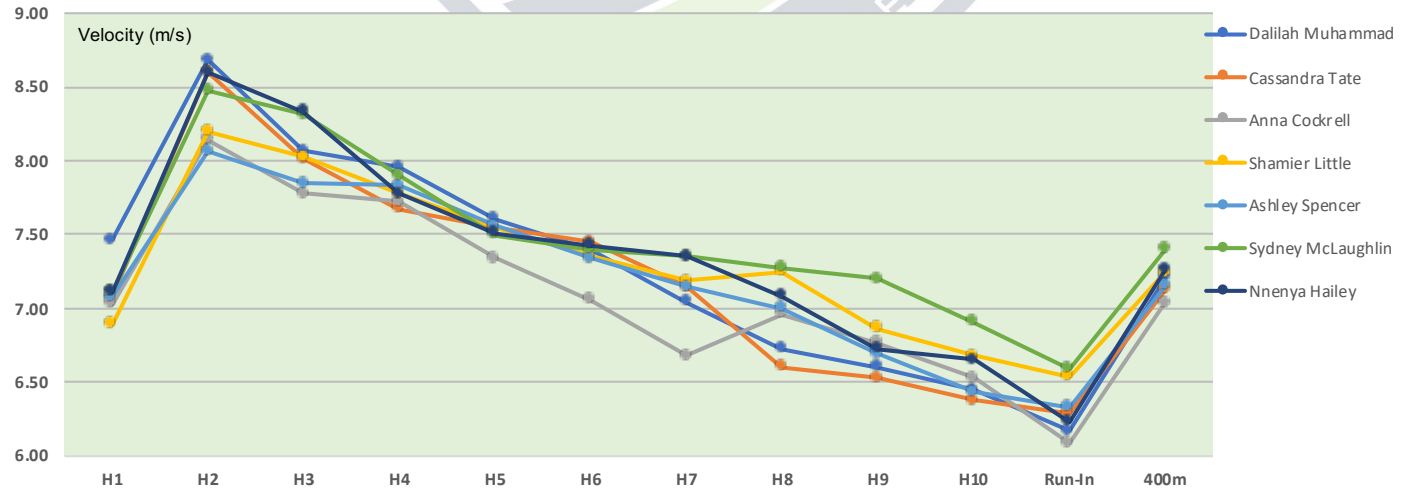
Heat 2

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
Little, Shamier (USA) (1995)	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		strides	23	15	15	15	16	16	16	16	19	183				
Spencer, Ashley (USA) (1993)	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		strides	22	15	15	15	15	15	15	15	18	175				

Date 2021.06.25

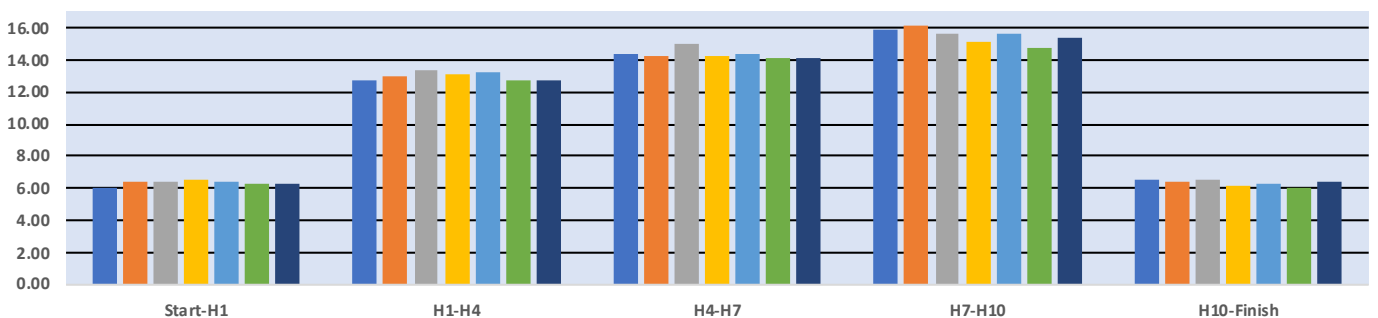
Heat 1

		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (1999)	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		strides	22	14	14	15	15	15	15	16	18.2	174.2				
Hailey, Nnenna (USA) (1994)	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		strides	16	16	17	17	17	17	18	18	22.2	175.2				



Time Intervals (s)

Hurdle Phases



Evaluated with: ObjectusVideo

Quality & Frame Rate: 1920 x 1080 @ 30fps

Timing From: First Movement

Source: <https://www.youtube.com/watch?v=0hAEK8AeHsk&t=95s>

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	7.83	7.59	7.28	6.86	6.94	7.48	7.57		8.25	7.80	7.02
	H1 lead leg	R	strides	22	15	14	14	14	14	15	16	16	18.5	158.5			

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	PB	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

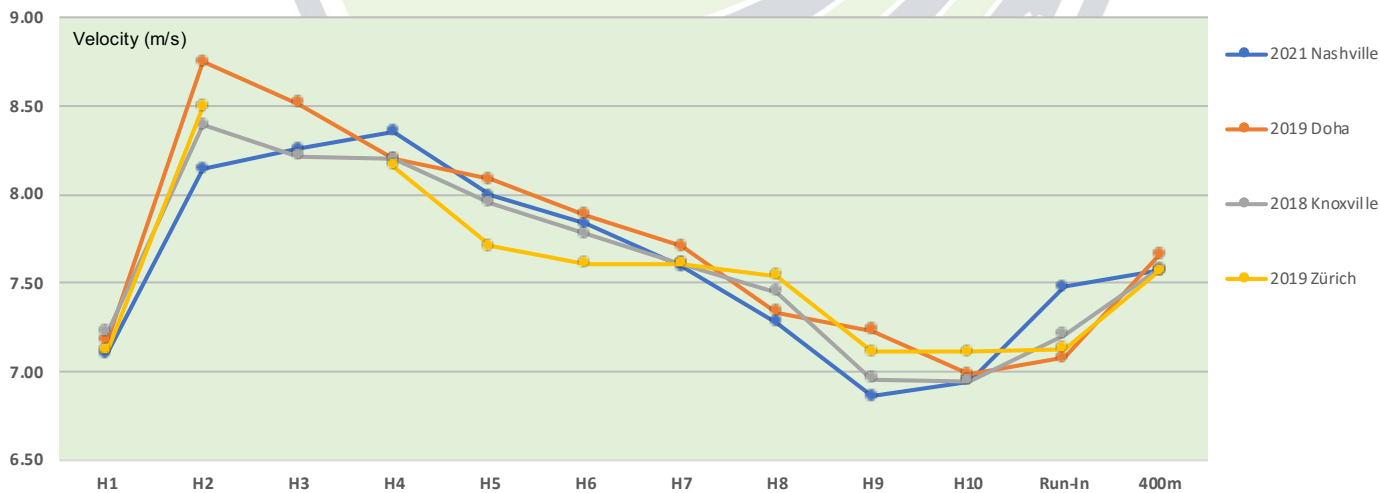
		H1	H2	H3	H4	H5	H6	H7	H8	H9	H10	Run-In	400m	Lane / Place	H1-H4	H4-H7	H7-H10
McLaughlin, Sydney (USA) (1999)	time	6.23	10.40	14.66	18.93	23.33	27.83	32.43	37.13	42.16	47.20		52.75	5 / 1			
	reaction time		interval	4.17	4.26	4.27	4.40	4.50	4.60	4.70	5.03	5.04	5.55	WJR PB	12.70	13.50	14.77
	velocity	7.22	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	16	16	16	18.5	155.5			

2019 Weltklasse (Zürich, SUI) (TV Analysis)

Date 2018.05.13

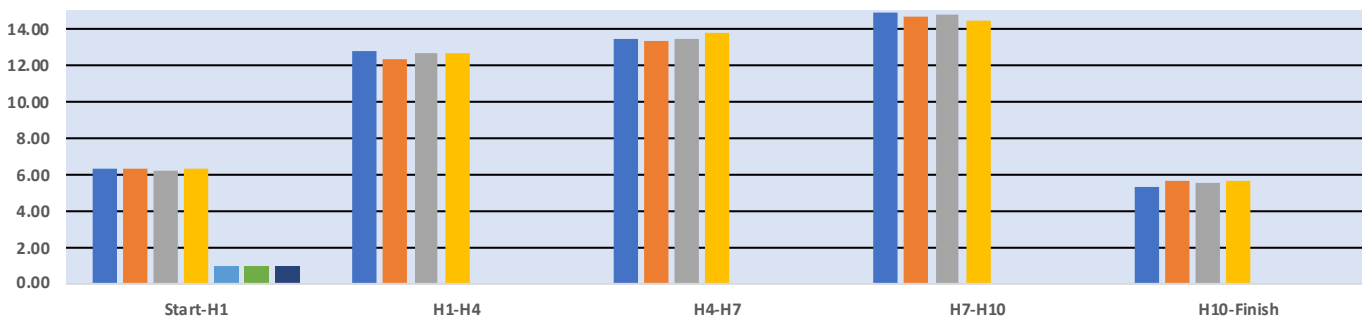
FINAL

		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	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=Xi0evM1wUq>

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

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>

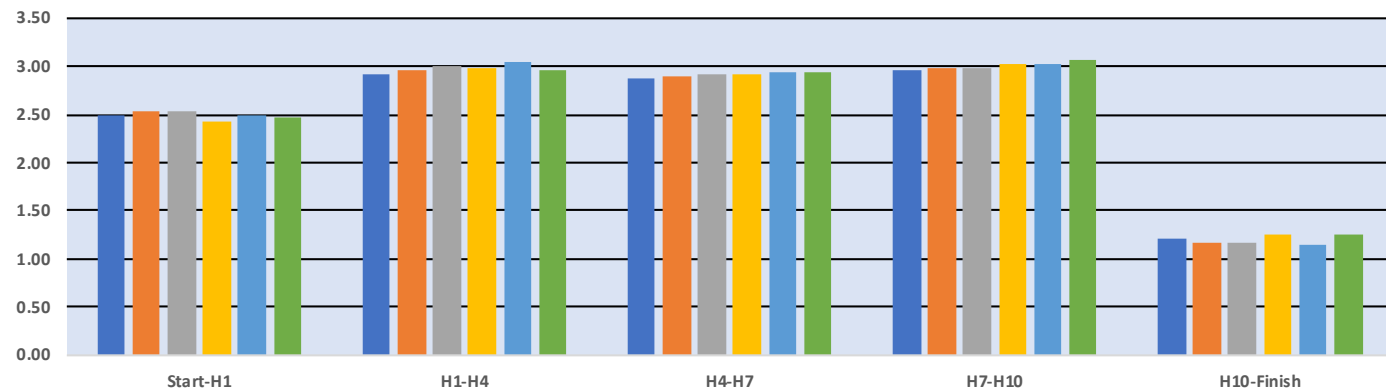
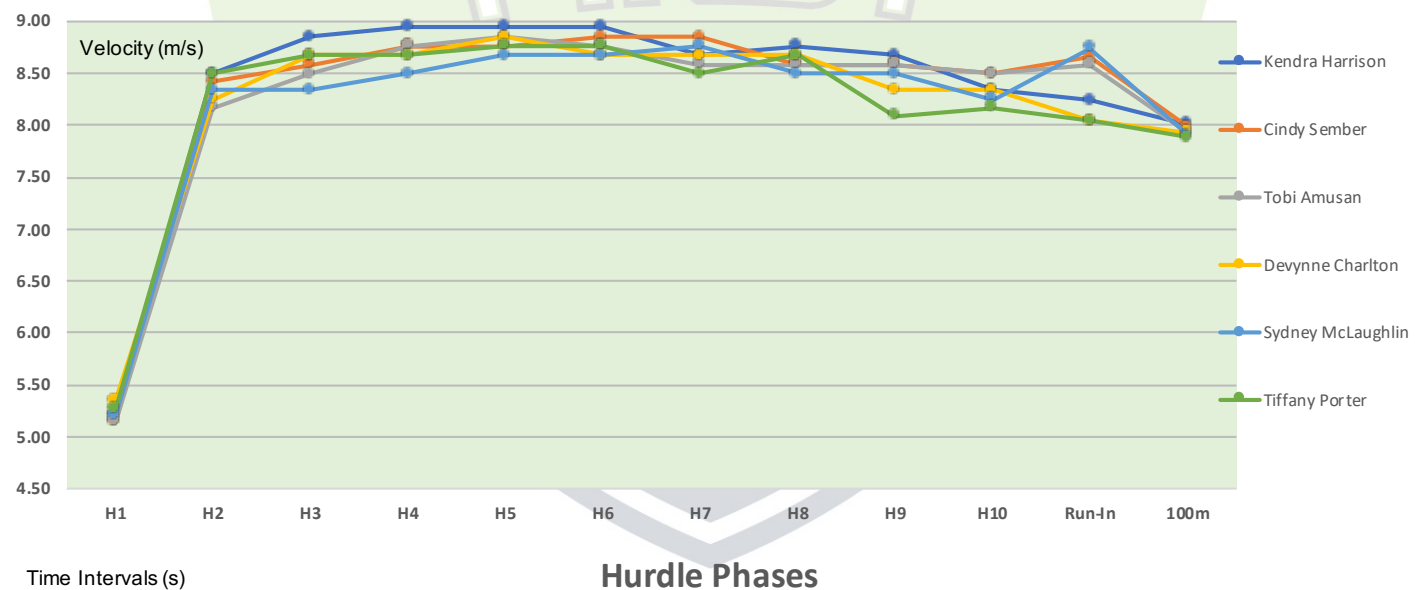
2021 USATF Golden Games (Walnut, CA) (TV Analysis)

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 / 4			
	reaction time	0.175													3.04	2.93	3.03
	interval		1.02	1.02	1.00	0.98	0.98	0.98	0.97	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

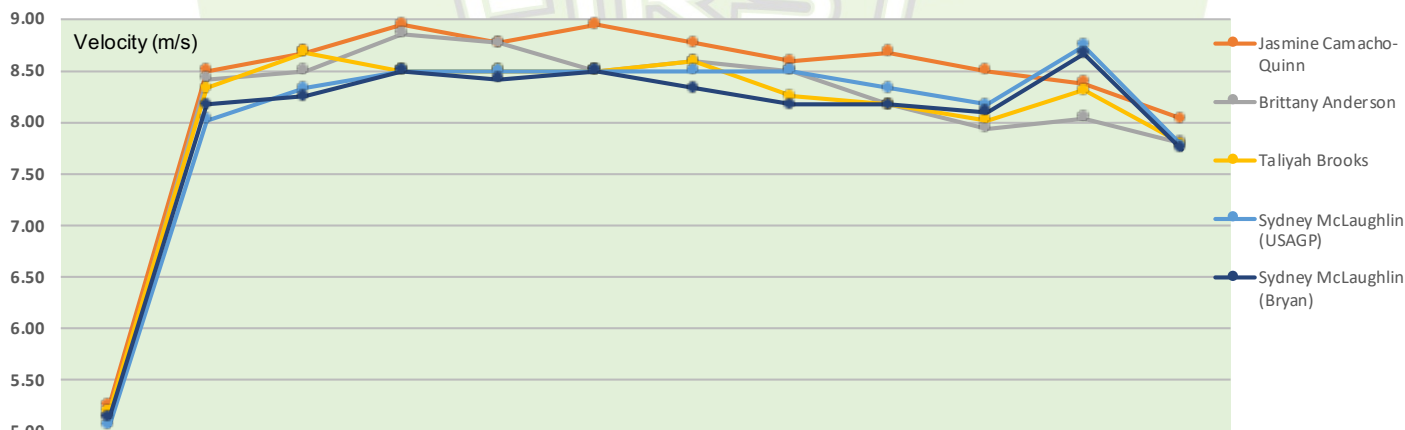
Biomechanical Analysis

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	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	1.04	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				

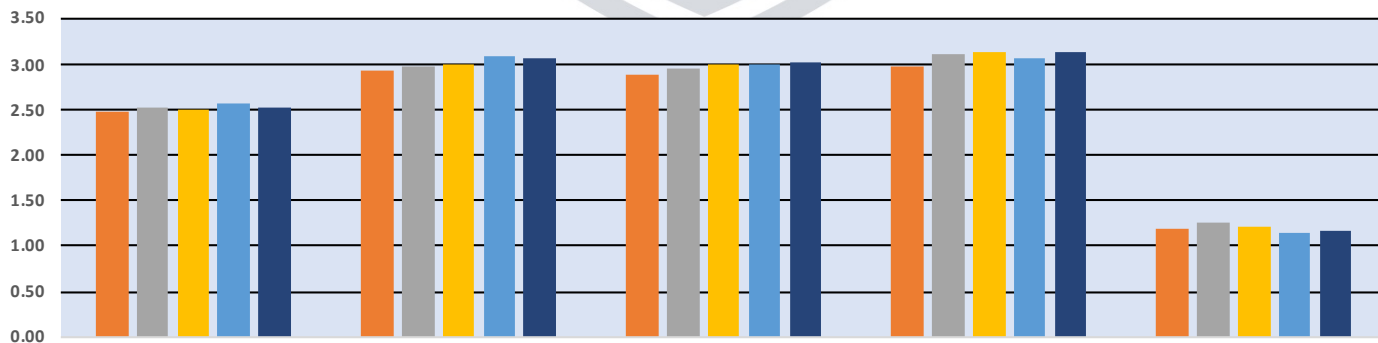
2021 Bryan Clay Invitational (Azusa, CA) (TV Analysis)

		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	1.00	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				



Time Intervals (s)

Hurdle Phases



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>