

CV: Taylor James Bell, Ph.D.

CONTACT INFORMATION	BAER Institute, NASA Ames Research Center, Moffet Field, CA, 94035, USA	<i>Email:</i> bell@baeri.org <i>Website:</i> www.taylorbell.ca <i>ORCID:</i> 0000-0003-4177-2149
RESEARCH INTERESTS	Exoplanet atmospheric characterization: phase curves, eclipse mapping, transit spectroscopy, open-source software, ultra-hot Jupiters, high-precision polarimetry	
EMPLOYMENT & EDUCATION	Postdoctoral Research Scientist, BAER Institute, NASA Ames 09/2021–Present Ph.D. Physics, McGill University 09/2016–07/2021 <ul style="list-style-type: none">Supervisors: Nicolas Cowan (McGill) and Pierre Bastien (University of Montréal)Thesis: Characterizing Ultra-hot Jupiters Through Theoretical Modelling and Precise Observations B.Sc. Honours Physics, University of Saskatchewan 09/2012–05/2016 <ul style="list-style-type: none"><i>High honours</i> specializing in astronomy, minors in computer science and mathematicsHonours Thesis Supervisor: Doug Welch (McMaster University) NSERC USRA, University of Toronto 05/2015–08/2015 NSERC USRA & Research Assistant, McMaster University 05/2014–12/2014	
STUDENT SUPERVISION (*=COADVISED)	Isaac Edelman, BAERI Research Intern (Winter 2023) Isaac Edelman* (w/Ben Lew), NASA Ames Astrophysics Intern (Fall 2022) Xueying Li* (w/Cowan), McGill University Math and Physics (Winter 2021) Thomas Villeneuve* (w/Cowan), McGill University Math and Physics (Winter 2021) Zachary Yetman* (w/Cowan), John Abbot College Pure & Applied Sciences (Winter 2019)	
SUCCESSFUL PROPOSALS	Stevenson, K.B (co-PI), Bell, T.J. (co-PI), et al. (2023). JWST Archival Research Proposal. Gillon, M., et al. (2023). JWST/MIRI Proposal (71.6 hours). Bell, T.J. , et al. (2021). CFHT/SPIRou Proposal (9 hours). Bell, T.J. , et al. (2020). HST/WFC3 Proposal (22 orbits). Bean, J.L., et al. (2018). Spitzer/IRAC Proposal (620 hours). Beatty, T., et al. (2018). Spitzer/IRAC Proposal (44.2 hours).	
AWARDS	NSERC Postgraduate Scholarships-Doctoral Program, McGill University 2018 – 2021 TEPS Ph.D. Fellowship, McGill University 2020 – 2021 FRQNT International Internship Program, Oxford University 2018/10 – 2018/12 McGill Space Institute Graduate Fellowship, McGill University 2016 – 2017 McGill Physics Graduate Excellence Fellowship, McGill University 2016 Department of Physics Recruitment Award, McGill University 2016 Astrophysics Group Recruitment Bonus, McGill University 2016 Gerry "Git" Rempel Memorial Scholarship, University of Saskatchewan 2015 1st Place Team, USask Programming Contest: Novice Category 14/02/2015 James F. Mathison Memorial Scholarship, University of Saskatchewan 2014 Dennis Skopik and Dennis Johnson Scholarship, University of Saskatchewan 2013 Undergraduate Scholarship, University of Saskatchewan 2013 Centennial Fund Scholarship, University of Saskatchewan 2013 General Proficiency Award, University of Saskatchewan 2012 Greystone Scholarship, University of Saskatchewan 2012	

TEACHING
EXPERIENCE

McGill University, Montréal, QC

Teaching Assistant

09/2016–12/2020

- Marker for PHYS 131: Mechanics and Waves (Fall 2020)
- Lab Demonstrator for PHYS 321: Data Sci & Obs Astrophysics (Winter 2020)
- Marker for PHYS 333: Thermal and Statistical Physics (Winter 2018)
- Marker for PHYS 214: Introductory Astrophysics (Fall 2017)
- Marker for PHYS 182: Our Evolving Universe (Fall 2016)

University of Saskatchewan, Saskatoon, SK

Teaching Assistant

01/2015–04/2016

- Research Coach for ASTR 104: Astronomy of Planets (Winter 2016)
- Laboratory Teaching Assistant for ASTR 214: Astronomical Spectroscopy (Fall 2015)
- Laboratory Teaching Assistant for ASTR 103 (now 113): Descriptive Introduction to Stellar Astronomy (Winter 2015)

OPEN SOURCE
SOFTWARE

[Eureka!](#) — An End-to-End Pipeline for JWST Time-Series Observations

[SPCA](#) — An End-to-End Pipeline for Spitzer Time-Series Observations

[Bell_EBM](#) — An Object-Oriented Energy Balance Model

[EPPE](#) — A Mission Simulator for the ÉPPE Mission Concept Study

FIRST AUTHOR
PAPERS

26 Papers (8 as first author, 4 white papers), 778 citations (239 as first author); [Full ADS List](#)

Bell, T.J., Crouzet, N., Kreidberg, L., et al. (2023). *Nightside clouds and disequilibrium chemistry on the hot Jupiter WASP-43b*, accepted in principle for publication in *Nature Astronomy*.

Bell, T.J., Welbanks, L., Schlawin, E., et al. (2023). *Methane Throughout the Atmosphere of the Warm Exoplanet WASP-80b*, accepted for publication in *Nature*.

Bell, T.J., Kreidberg, L., Kendrew, S., et al. (2023). *A First Look at the JWST MIRI/LRS Phase Curve of WASP-43b*, JTEC-ERS arXiv Technical Note.

Bell, T.J., Ahner, E.-M., Brande, J., et al. (2022). *Eureka!: An End-to-End Pipeline for JWST Time-Series Observations*, *Journal of Open Source Software*, 7(79), 4503.

Bell, T.J., Dang, L., Cowan, N.B., et al. (2021). *A Comprehensive Reanalysis of Spitzer's 4.5 μm Phase Curves, and the Phase Variations of the Ultra-hot Jupiters MASCARA-1b and KELT-16b*, *MNRAS*, 504(3), 3316–3337.

Bell, T.J., Zhang, M., Cubillos, P.E., et al. 2019. *Mass loss from the exoplanet WASP-12b inferred from Spitzer phase curves*, *MNRAS*, 489(2), 1995–2013.

Bell, T.J. & Cowan, N.B. 2018. *Increased Heat Transport in Ultra-Hot Jupiter Atmospheres Through H_2 Dissociation and Recombination*, *ApJL*, 857, L20.

Bell, T.J., Nikolov, N., Cowan, N.B., et al. 2017. *The Very Low Albedo of WASP-12b from Spectral Eclipse Observations with Hubble*, *ApJL*, 847, L2.

CO-AUTHOR
PAPERS

Greene, T.P., **Bell, T.J.**, Ducrot, E., et al. (2023). *Thermal emission from the Earth-sized exoplanet TRAPPIST-1 b using JWST*, *Nature*, 618, 39–42.

Coulombe, LP., Benneke, B., Challener, R., et al. (2023). *A broadband thermal emission spectrum of the ultra-hot Jupiter WASP-18b*, *Nature*.

Kempton, E.M.R., Zhang, M., Bean, J.L., et al. (2023). *A reflective, metal-rich atmosphere for GJ 1214b from its JWST phase curve*, *Nature*.

- Bouwman, J., Kendrew, S., Greene, T.P., **Bell, T. J.**, et al. (2023). *Spectroscopic time series performance of the Mid-Infrared Instrument on the JWST*, PASP, 135(1045), 038002.
- Feinstein, A.D., Radica, M., Welbanks, L., **et al.** (2023). *Early Release Science of the exoplanet WASP-39b with JWST NIRISS*, Nature, 614, 670–675.
- Alderson, L., Wakeford, H.R., Alam, M.K., **et al.** (2023). *Early Release Science of the Exoplanet WASP-39b with JWST NIRSpec G395H*, Nature, 614, 664–669.
- Rustamkulov, Z., Sing, D.K., Mukherjee, S., **et al.** (2023). *Early Release Science of the exoplanet WASP-39b with JWST NIRSpec PRISM*, Nature, 614, 659–663.
- Ahrer, E.-M., Stevenson, K.B., Mansfield, M., **et al.** (2023). *Early Release Science of the exoplanet WASP-39b with JWST NIRCам*, Nature, 614, 653–658.
- JWST Transiting Exoplanet Community Early Release Science Team (2022). *Identification of carbon dioxide in an exoplanet atmosphere*, Nature, 614, 649–652.
- Mercier, S.J., Dang, L., Gass, A., Cowan, N.B., & **Bell, T.J.** (2022). *Revisiting the Iconic Spitzer Phase Curve of 55 Cancri e: Hotter Dayside, Cooler Nightside, and Smaller Phase Offset*, AJ, 164(5), 204.
- May, E., Stevenson, K., Bean, J., **Bell, T.J.**, et al. (2022). *A New Analysis of 8 Spitzer Phase Curves and Hot Jupiter Population Trends: Qatar-1b, Qatar-2b, WASP-52b, WASP-34b, and WASP-140b*, AJ, 163(6), 256.
- Dang, L., **Bell, T.J.**, Cowan, N.B., et al. (2021). *Thermal Phase Curves of XO-3b: an Eccentric Hot Jupiter at the Deuterium Burning Limit*, AJ, 163(1), 32.
- Tinetti, G., Eccleston, P., Haswell, C., **et al.** (2021). *Ariel: Enabling planetary science across light-years*, Ariel Definition Study Report, 147 pages.
- Charnay, B., Mendonça, J., Kreidberg, L., **et al.** (2020). *A survey of exoplanet phase curves with Ariel*, accepted for publication in Experimental Astronomy, Ariel Special Issue.
- Keating, D., Stevenson, K.B., Cowan, N.B., **et al.** (2020). *Smaller than expected bright-spot offsets in Spitzer phase curves of the hot Jupiter Qatar-1b*, AJ, 159(5), 225.
- Mansfield, M., Bean, J.L., Stevenson, K.B., **et al.** (2020). *Evidence for H₂ Dissociation and Recombination Heat Transport in the Atmosphere of KELT-9b*, ApJL, 888(2), L15.
- Benneke, B.; Cowan, N.B.; Rowe, J., **et al.** (2019). *Exoplanet instrumentation in the 2020s: Canada's pathway towards searching for life on potentially Earth-like exoplanets*, Canadian Long Range Plan for Astronomy and Astrophysics White Papers, LRP2020.
- Metchev, S.; Artigau, É.; **Bell, T.J.**, et al. (2019). *Continuing Canadian Leadership in Small-satellite Astronomy*, Canadian Long Range Plan for Astronomy and Astrophysics White Papers, LRP2020.

SELECT PRESS
COVERAGE

<i>Webb Measures the Temperature of a TRAPPIST-1 Exoplanet</i> , NASA	27/03/2023
Comet NEOWISE, CJAD 800: The Elias Makos Show	22/07/2020
<i>Astronomers discover pitch-black planet orbiting distant star</i> , CBC	19/09/2017
Daybreak Montreal, CBC Radio One	19/09/2017
Recorded Interview, CJWW Radio	16/09/2017
<i>NASA's Hubble Captures Blistering Pitch-Black Planet</i> , STScI	14/09/2017
<i>Hubble Observes Pitch Black Planet</i> , ESA/Hubble	14/09/2017
<i>Transit of Mercury</i> , Evening News Saskatoon, Global News	09/05/2016
<i>Comet ISON</i> , CTV News at Six Saskatoon, CTV	29/11/2013
<i>Astronomers Fascinated by Comet ISON</i> , Evening News Saskatoon, Global News	29/11/2013

PUBLIC LECTURES	AstroMcGill Public AstroPhysics Nights. Montreal, QC.	24/07/2020
	Royal Astronomical Society of Canada - Saskatoon Centre. Saskatoon, SK.	16/05/2016
	Royal Astronomical Society of Canada - Saskatoon Centre. Saskatoon, SK.	21/04/2014
SELECT VOLUNTEER EXPERIENCES	LOC Committee Member: CASCA 2019, McGill University	08/2018–06/2019
	Outreach Coordinator: AstroMcGill, McGill University	01/2019–12/2019
	Website Administrator: AstroMcGill, McGill University	04/2018–12/2019
	Website Administrator: Physics Matters Public Outreach, McGill University	09/2017–01/2019
	Planning Committee: McGill Physics Hackathon, McGill University	03/2018–09/2018
	Observatory Head: AstroMcGill, McGill University	02/2018–09/2018
	Observatory Guide: University of Saskatchewan	01/2014–08/2016
	Website Administrator: WIPC Conference 2016, University of Saskatchewan	10/2015–07/2016
	Member at Large: Physics Student Society, University of Saskatchewan	05/2015–04/2016
	Resident Care Volunteer: Luther Special Care Home, Saskatoon, SK	2013–2016
	Telescope Operator: AstroTours, University of Toronto	05/2015–08/2015
	Webmaster: Physics Student Society, University of Saskatchewan	09/2014–04/2015
	Camp Counsellor: Camp Christopher, SK	06/2011–08/2011 & 06/2012–08/2012
CONFERENCE ABSTRACTS	Bell, T.J., et al. (2024). <i>Methane Throughout the Atmosphere of the Warm Exoplanet WASP-80b</i> , AAS 243. Oral Presentation	
	Bell, T.J., et al. (2023). <i>Eureka!: An End-to-End Pipeline for JWST Time-Series Observations</i> , Improving JWST Data Products Workshop 2023. Invited Oral Presentation	
	Bell, T.J., et al. (2023). <i>Hands-on Sessions I and II: Reducing & Fitting JWST Data with Eureka!</i> , Sagan Summer Workshop 2023. Developed and Led 2 Hands-On Sessions	
	Bell, T.J., et al. (2023). <i>Discovery of Thermal Emission from the Earth-sized Exoplanet TRAPPIST-1b using JWST</i> , STSci Spring Symposium 2023. Oral Presentation	
	Greene, T.P., Bell, T.J., et al. (2023). <i>Detection of thermal emission from TRAPPIST-1 b with JWST</i> , Bay Area Exoplanet Meeting #43. Oral Presentation	
	Bell, T.J., et al. (2023). <i>JWST Transiting Exoplanet Early Release Science: A Full Orbit Spectroscopic Phase Curve of WASP-43b with MIRI/LRS</i> , AAS 241, Early Transiting Exoplanet Science with JWST Special Session. Invited Oral Presentation	
	Bell, T.J., et al. (2022). <i>MIRI Transmission and Emission Spectroscopy of the Warm Jupiter WASP-80b</i> , Celebrating JWST's First Six Months of Exoplanet Data. Oral Presentation	
	Bell, T.J. & Edelman, I. (2022). <i>Eclipse Mapping and Spectroscopy of HD 189733b with JWST/NIRCam</i> , Bay Area Exoplanet Meeting #42. Oral Presentation	
	Bell, T.J., et al. (2022). <i>Lessons Learned From Spitzer's Exoplanet Phase Curve Survey</i> , Bay Area Planetary Science Conference. Invited Oral Presentation	
	Bell, T.J., et al. (2021). <i>A Comprehensive Reanalysis of Spitzer's 4.5 Micron Phase Curves</i> , Bay Area Exoplanet Meeting #38. Oral Presentation	
	Bell, T.J., et al. (2021). <i>Developing and Testing a Novel Physical Model for Ultra-hot Jupiter Atmospheres</i> , AAS 237. Dissertation Oral Presentation	
	Bell, T.J., et al. (2020). <i>SPCA: An Open-Source, Modular, and Automated Pipeline for Spitzer Phase Curve Analyses</i> , Exoplanets III. HTML Poster	
	Bell, T.J., et al. (2020). <i>SPCA: An Open-Source, Modular, and Automated Pipeline for Spitzer Phase Curve Analyses</i> , AAS 236. iPoster Plus	

- Bell, T.J., et al. (2020). *SPCA: An Open-Source, Modular, and Automated Pipeline for Spitzer Phase Curve Analyses*, *Celebrating the Legacy of the Spitzer Space Telescope*. Poster
- Bell, T.J., et al. (2019). *ÉPPÉ: A Microsatellite Mission Concept to Characterize Exoplanets*, *Montreal Space Symposium 2019*. Oral Presentation
- Bell, T.J., et al. (2019). *Mass Loss From the Exoplanet WASP-12b Inferred from Spitzer Phase Curves*, *Extreme Solar Systems IV*. Oral Presentation
- Bell, T.J., et al. (2019). *Mass Loss From the Exoplanet WASP-12b Inferred from Spitzer Phase Curves*, *WIPC 2019*. Poster
- Bell, T.J., et al. (2019). *Mass Loss From the Exoplanet WASP-12b Inferred from Spitzer Phase Curves*, *CASCA 2019 Annual General Meeting*. Poster
- Bell, T.J., et al. (2019). *Mass Loss From the Exoplanet WASP-12b Inferred from Spitzer Phase Curves*, *Centre de Recherche en Astrophysique du Québec 2019 Annual Meeting*. Oral Presentation
- Bell, T.J., et al. (2019). *Analyzing Hubble Space Telescope Data with Gaussian Processes*, *McGill Physics & AI Workshop*. Poster
- Bell, T.J. & Cowan, N.B. (2018). *H₂ Dissociation: A Latent Heat Analogue for the Hottest Exoplanets*, *Oxford Planets Network Workshop 2018*. Oral Presentation
- Bell, T.J. & Cowan, N.B. (2018). *WASP-12b: A Case Study on Ultra-Hot Jupiter Atmospheres*, *Cloud Academy: Cloud Formation and Properties in Extrasolar Planets*. Poster
- Bell, T.J., et al. (2018). *WASP-12b: A Case Study on Ultra-Hot Jupiter Atmospheres*, *Exoplanets II*. Poster
- Bell, T.J. & Cowan, N.B. (2018). *WASP-12b: A Case Study on Ultra-Hot Jupiter Atmospheres*, *TEPS Summer Skills Conference*. Oral Presentation
- Bell, T.J. & Cowan, N.B. (2018). *WASP-12b: A Case Study on Ultra-Hot Jupiter Atmospheres*, *Centre de Recherche en Astrophysique du Québec 2018 Annual Meeting*. Oral Presentation
- Bell, T.J., et al. (2017). *The Very Low Albedo of WASP-12b from Spectral Eclipse Observations with Hubble*, *Exoclipse 2017*. Poster
- Bell, T.J., et al. (2017). *HST/STIS Observations of the Hot Jupiter WASP-12b: New Insights into the Albedo Problem*, *Centre de Recherche en Astrophysique du Québec 2017 Annual Meeting*. Oral Presentation
- Bell, T.J., Suen, C., et al. (2014). *A Uniform, Modern Atlas and Tools for Globular Cluster Variable Stars*, *CUPC 2014*. Poster