

Ryan Cloutier, PhD

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Research Positions

Post Graduate

Banting Fellow 2021-present

Center for Astrophysics | Harvard & Smithsonian

Postdoctoral Fellow 2019-2021

Center for Astrophysics | Harvard & Smithsonian

Graduate

PhD Candidate 2014-2019

Department of Astronomy & Astrophysics (UofT), Centre for Planetary Sciences, and the Institute for Research on Exoplanets

Undergraduate

Undergraduate Researcher 2012-2014

Canadian Institute for Theoretical Astrophysics, Dunlap Institute for Astronomy & Astrophysics, Department of Astronomy & Astrophysics (UofT)

Education

PhD in Astronomy & Astrophysics, University of Toronto 2014-2019

Advisors: Prof. Kristen Menou and Prof. René Doyon

Thesis: *Semi-Parametric Methods to Aid in the Detection and Characterization of Distant Worlds Around Small Stars*

Honours Bachelor of Science w/ Distinction, University of Toronto 2009-2014

Advisor: Prof. Ray Jayawardhana

Thesis: *A Deep Spitzer Survey of Circumstellar Disks in the Young Double Cluster, θ Persei*

First Author Refereed Publications (16)

Cloutier, R., Charbonneau, D., Deming, D., Bonfils, X., Astudillo-Defru, N. *A More Precise Mass for GJ 1214 b and the Frequency of Multi-Planet Systems Around Mid-M Dwarfs*, 2021, [AJ in press](#)

Cloutier, R., Charbonneau, D., Stassun, K.G., et al. *TOI-1634 b: an Ultra-Short Period Keystone Planet Sitting Inside the M Dwarf Radius Valley*, 2021, [AJ, 162, 79](#)

Cloutier, R., Rodriguez, J., Irwin, J., et al. *TOI-1235 b: a Keystone Super-Earth for Testing Radius Valley Emergence Models Around Early M Dwarfs*. 2020, [AJ, 160, 22](#)

Cloutier, R., Eastman, J., Rodriguez, J., et al. *A Pair of TESS Planets Spanning the Radius Valley Around the Nearby Mid-M Dwarf LTT 3780*. 2020, [AJ, 160, 3](#)

Cloutier, R. & Menou, K.. *Evolution of the Radius Valley Around Low Mass Stars from Kepler and K2*. 2020, [AJ, 159, 211](#)

Cloutier, R., Astudillo-Defru, N., Bonfils, X., et al. *Characterization of the L 98-59 multi-planetary system with HARPS: Mass Characterization of a Hot Super-Earth, a Sub-Neptune, and a Mass Upper Limit on the Third Planet*. 2019, [A&A, 629A, 111](#)

Cloutier, R. *The Independent Discovery of Planet Candidates Around Low Mass Stars and Astrophysical False Positives in the First Two TESS Sectors*. 2019, [AJ, 158, 81](#)

Cloutier, R., Astudillo-Defru, N., Doyon, R., et al. *Confirmation of the Radial Velocity Super-Earth K2-18c with HARPS and CARMENES*. 2019, [A&A, 621A, 49](#)

Cloutier, R., Doyon, R., Bouchy, F., Hébrard, G. *Quantifying the Observational Effort Required for the Radial Velocity Characterization of TESS Planets*. 2018, [AJ, 156, 82](#)

Cloutier, R., Artigau, É., Delfosse, X., et al. *Predictions of Planet Detections with Near-Infrared Radial Velocities in the Up-coming SPIRou Legacy Survey-Planet Search*. 2018, [AJ, 155, 93](#)

Cloutier, R., Astudillo-Defru, N., Doyon, R., et al. *Characterization of the K2-18 multi-planetary system with HARPS: A Habitable Zone Super-Earth and Discovery of a Second, Warm Super-Earth on a Non-Coplanar Orbit*. 2017, [A&A, 608A, 35](#)

Cloutier, R., Doyon, R., Menou, K., et al. *On the Radial Velocity Detection of Additional Planets in Transiting, Slowly Rotating M Dwarf Systems: The Case of GJ 1132*. 2017, [AJ, 153, 9](#)

Cloutier, R. & Triaud, A.H.M.J. Menou, K. *Prospects for Detecting the Rossiter-McLaughlin Effect of Earth-like Planets: The Test Case of TRAPPIST-1b and c*. 2016, [MNRAS, 462, 4018](#)

Cloutier, R., Tamayo, D., & Valencia D. *Could Jupiter or Saturn have Ejected a Fifth Giant Planet?* 2015, [ApJ, 813, 8](#)

Cloutier, R., Currie, T., Rieke G., et al. *A Deep Spitzer Study of Circumstellar Disks in the Young Double Cluster, η and χ Persei*. 2014, [ApJ, 796, 127](#)

Cloutier, R. & Lin, M.K. *Orbital Migration of Giant Planets Induced by Gravitationally unstable Gaps: The Effect of Planet Mass*. 2013, [MNRAS, 434, 621](#)

Contributed Author Refereed Publications (26)

Boucher, A., et al. (including **Cloutier, R.**) *Characterizing Exoplanetary Atmospheres at High Resolution with SPIRou: Detection of Water on HD 189733 b*, 2021, [AJ in press](#)

Teske, J., et al. (including **Cloutier, R.**) *The Magellan-TESS Survey I: Survey Description and Mid-Survey Results*, 2021, [AJ in press](#)

Bluhm, P., et al. (including **Cloutier, R.**) *An Ultra-Short Period Transiting Super-Earth Orbiting the M3 Dwarf TOI-1685*, 2021, [A&A, 650A, 78](#)

Soto, M.G., et al. (including **Cloutier, R.**) *Mass and Density of the Transiting Hot and Rocky Super-Earth LHS 1478 b*, 2021, [A&A, 649A, 144](#)

Ment, K., et al. (including **Cloutier, R.**) *TOI-540 b: a Planet Smaller than Earth Orbiting a Nearby Rapidly Rotating Low-Mass Star*, 2021, [AJ, 161, 23](#)

Osborn, A., et al. (including **Cloutier, R.**) *TOI-431/HIP 26013: a super-Earth and a sub-Neptune transiting a bright, early K dwarf, with a third RV planet*, 2021, [MNRAS in press](#)

Luque, R., et al. (including **Cloutier, R.**) *A Planetary System with Two Transiting Mini-Neptunes Near the Radius Valley Transition around the Bright M Dwarf TOI-776*, 2021, [A&A, 645A, 41](#)

Klein, B., et al. (including **Cloutier, R.**) *Investigating the Young AU Mic System with SPIRou: Large-Scale Stellar Magnetic Field and Close-in Planet Mass*, 2021, [MNRAS, 502, 188](#)

Newton, E., et al. (including **Cloutier, R.**) *TESS Hunt for Young and Maturing Exoplanets (THYME). IV. Three Small Planets Orbiting a 120 Myr Old Star in the Pisces-Eridanus Stream*, 2021, [AJ, 161, 65](#)

Daylan, T., et al. (including **Cloutier, R.**) *TESS Discovery of a Super-Earth and Three Sub-Neptunes Hosted by the Bright, Sun-like star HD 108236*, 2021, [AJ, 161, 85](#)

Sha, L., et al. (including **Cloutier, R.**) *TOI-954 b and EPIC 246193072 b: Short-Period Saturn-Mass Planets that Test Whether Irradiation Leads to Inflation*, 2021, [AJ, 161, 82](#)

Dumusque, X., et al. (including **Cloutier, R.**) *Three Years of HARPS-N High-Resolution Spectroscopy and Precise Radial Velocity Data for the Sun*, 2020, [A&A, 648A, 103](#)

Kemmer, J., et al. (including **Cloutier, R.**) *Discovery of a Hot, Transiting, Earth-Sized Planet and a Second Temperate, Non-Transiting Planet Around the M4 Dwarf GJ 3473*, 2020, [A&A, 642A, 236](#)

Martoli, E., et al. (including **Cloutier, R.**) *Magnetism and Spin-Orbit Alignment in the Young Planetary System AU Mic*, 2020, [A&A, 641L, 1](#)

Astudillo-Defru, N., **Cloutier, R.**, Wang, S., et al. *A Hot Terrestrial Planet Orbiting the Bright M Dwarf L 168-9 Unveiled by TESS*, 2020, [A&A, 636A, 58](#)

Gilbert, E., et al. (including **Cloutier, R.**) *The First Habitable Zone Earth-Sized Planet from TESS I: Validation of the TOI-700 System*, 2020, [AJ, 160, 116](#)

Rodriguez, J., et al. (including **Cloutier, R.**) *The First Habitable Zone Earth-Sized Planet from TESS I: Spitzer Confirms TOI-700 d*, 2020, [AJ, 160, 117](#)

Shporer, A., et al. (including **Cloutier, R.**) *GJ 1252b: a 1.2 R_{\oplus} Planet Transiting an M Dwarf at 20.4 pc*, 2020, [ApJ, 890, 7](#)

Nelson, B., Ford, E., Buchner, J., **Cloutier, R.**, et al. *Quantifying the Evidence for a Planet in Radial Velocity Data*, 2020, [AJ, 159, 73](#)

Dalba, P., et al. (including **Cloutier, R.**) *The TESS-Keck Survey. I. A Warm Sub-Saturn-Mass Planet and a Caution about Stray Light in TESS Cameras*, 2020, [AJ, 159, 241](#)

Bonfils, X., Almenara, J.M., **Cloutier, R.**, et al. *Radial Velocity Follow-up of GJ 1132 with HARPS: a Precise Mass for Planet 'b' and the Discovery of a Second Planet*, 2018, [A&A, 618A, 142](#)

Ment, K., et al. (including **Cloutier, R.**) *A Second Planet with an Earth-like Composition Orbiting the Nearby M dwarf LHS 1140*, 2018, [AJ, 157, 32](#)

Currie, T., Grady, C., **Cloutier, R.**, et al. *The Matryoshka Disk: Keck/NIRC2 Discovery of a Solar System-Scale, Radially Segregated Residual Protoplanetary Disk Around HD 141569A*, 2016, [ApJL, 819, 26](#)

Currie, T., **Cloutier, R.**, Brittain, S., et al. *Resolving the HD 100546 Protoplanetary System with the Gemini Planet Imager: Evidence for Multiple Forming, Accreting Planets*, 2015, [ApJL, 814, 27](#)

Currie, T., Burrows, A., Girard, J., **Cloutier, R.**, et al. *Deep Thermal Infrared Imaging of HR 8799 bcde: New Atmospheric Constraints and Limits on a Fifth Planet*, 2014, [ApJ, 795, 133](#)

Currie, T., **Cloutier, R.**, Debes, J., Kenyon, S., & Kessler, D. A Deep Keck/NIRC2 Search for Thermal Emission from Planetary Companions Orbiting Fomalhaut, 2013, [ApJL, 777, 6](#)

Preprints (2)

Winters, J., **Cloutier, R.**, Medina, A., et al. A Second Planet Transiting LTT 1445A and a Determination of the Masses of Both Worlds, 2021, [AJ submitted](#)

Saunders, N., et al. (including **Cloutier, R.**) TESS Giants Transiting Giants I: A Non-inflated Hot Jupiter Orbiting a Massive Subgiant, 2021, [AJ submitted](#)

Non-Refereed Publications (2)

Benneke, B., et al. (including **Cloutier, R.**) Exoplanet Instrumentation in the 2020s: Canada's Pathway Towards Searching for Life on Potentially Earth-like Exoplanets, 2020, [Canadian Long Range Plan for Astronomy and Astrophysics, LRP2020](#)

Bouchy, F., et al. (including **Cloutier, R.**) Near-InfraRed Planet Searcher to Join HARPS on the ESO 3.6-metre Telescope, 2017, [The ESO Messenger, No. 169](#)

Invited Talks

Colloquia

Exoplanet Seminar **Cambridge University**
Testing Radius Valley Emergence Models Around M dwarfs with TESS 2020

Department colloquium **Geneva Observatory**
Reconciling the Planetary Interpretation of the Radial Velocity Super-Earth K2-18c 2019

Center for Exoplanet & Habitable Worlds seminar **Penn State**
A Semi-Parametric Approach to Stellar Activity and the Search for Terrestrial Mass Radial Velocity Planets 2019

Conference Presentations

Review Talks

Exoplanet Demographics **Virtual Conference**
Sculpting the Close-in Planet Population Across the Main Sequence 2020

Talks

Exoplanets III **Virtual Conference**
Evolution of the Radius Valley from Sun-Like to Low Mass Stars 2020

235th AAS Meeting **Honolulu, HI**
Masses for Planets Transiting M Dwarfs 2020

235th AAS Meeting **Honolulu, HI**
Semi-Parametric Methods to Aid in the Detection and Characterization of Distant Worlds Around Small Stars 2020

TESS Science Conference I	Boston, MA
<i>Present and Future Efforts for PRV Characterization of Southern TESS Planets Through the HARPS M Dwarf Program</i>	2019
Extremely Precise Radial Velocities IV	Grindelwald, Switzerland
<i>Reconciling the Planetary Interpretation of the Radial Velocity Super-Earth K2-18c</i>	2019
2nd Rencontres de Vietnam on Exoplanetary Science	Quy Nhon, Vietnam
<i>Discovering the Closest Habitable Worlds: Planet Detection Predictions for the SPIRou Legacy Survey-Planet Search</i>	2018
CASCA 2017	Edmonton, AB
<i>Canadians on the Ground Searching for the Closest Habitable Worlds</i>	2017
SPIRou Science Meeting	Nice, France
<i>Simulated Searches for Small Radial Velocity Planets Amid Stellar Activity</i>	2016
CASCA 2016	Winnipeg, MA
<i>Detecting Potentially Habitable Earth-like Planets Around Cool Stars with SPIRou</i>	2016
Emerging Researchers in Exoplanet Science II	Cornell, Uni.
<i>Detecting Potentially Habitable Earth-like Planets Around Cool Stars with SPIRou</i>	2016
Select Posters	
Exoplanets III	Cambridge, UK
<i>Predictive Models of the RV Requirement to Measure Transiting Planet Masses or, How Long does it take to Detect 50 Small TESS Planets?</i>	2018
Extremely Precise Radial Velocities III	Penn State
<i>Planet Detection Predictions from Simulations of the SPIRou Legacy Survey-Planet Search</i>	2017
Extreme Solar Systems III	Waikoloa, HI
<i>The Rossiter-McLaughlin Effect of Planets Transiting M dwarfs and its Impact on Planet Detection in Radial Velocity Surveys</i>	2015
CASCA 2015	Hamilton, ON
<i>Could Jupiter have Ejected a Fifth Giant Planet from the Solar System?</i>	2015
Accepted PI Observing Programs	
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TESS Large Guest Investigator Program (Cycles 3 & 4) – \$250,000	
<i>Understanding the Physical Origin of the Rocky/Enveloped Transition Around Mid-to-Late M Dwarfs</i>	
TESS Small Guest Investigator Program (Cycle 4) – \$70,000	
<i>Radial Velocity Measurements with HARPS-N to Uncover the Formation Pathway of Keystone Planets Around M Dwarfs</i>	
Canada France Hawaii Telescope/SPIRou – (10.1 + 11.9 hrs)	
<i>Empirically calibrating the method to measure detailed M dwarf elemental abundances</i>	
Canada France Hawaii Telescope/SPIRou – (0.5 hrs)	
<i>Recovering the Detailed Internal Structure of the Massive Terrestrial Exoplanet TOI-1235 b</i>	

Canada France Hawaii Telescope/SPIRou — (16 + 12.3 hrs)

RVxTESS: Photometric and Spectropolarimetric Studies of M Dwarfs with Simultaneous TESS and CFHT/SPIRou Observations

Teaching & Mentoring

Student Advising

Anna Simpson (University of Michigan) 2021-present

Validation and Characterization of the TESS Multi-Planetary System Around the M Dwarf TOI-1730

Undergraduate Teaching

Head Teaching Assistant

ASTA02: *Beyond the Sun and Planets* 2017

ASTA01: *The Sun and Planets* 2016

AST201: *Stars and Galaxies* 2016

AST101: *The Sun and its Neighbours* 2015

Teaching Assistant

AST251: *Life on Other Worlds* 2018-2019

AST221: *Stars and Planets* 2017-2018

AST121: *The Origin and Evolution of the Universe* 2018

CSCC01: *Introduction to Software Engineering* 2016

AST201: *Stars and Galaxies* 2014-2015

AST101: *The Sun and its Neighbours* 2014-2015

Graduate Student Mentoring

Alysa Obertas (University of British Columbia) 2015-2016

Adiv Paradise (University of Minnesota) 2015-2016

Workshop Instructor

Workshop on Gaussian process regression in python 2016

Center for Planetary Sciences

Introductory statistics workshop for undergraduate STEM students 2015

Department of Astronomy & Astrophysics (UofT)

Astronomy workshop for Ontario elementary/secondary school teachers 2015-2016

York University

Outreach

Select Public Lectures & Presentations

Classroom Q&A session 2018

Christ the King Elementary School

AstroTour Public Lecture Series 2017

University of Toronto

The Long Path Towards Finding Habitable Exo-Worlds

Graduate Speaker Series: Astronomy and Astrophysics 2017

University of Toronto
The Long Path Towards Finding Habitable Exo-Worlds

Mystical Landscapes Planetarium Show 2016
Art Gallery of Ontario

Public Lecture 2015
North York Astronomical Association
Studying the early dynamical evolution of the solar system

Outreach Positions

UofT Planetarium 2015-2019
Planetarium operator

Science Unlimited Summer Camp 2017-2018
Camp volunteer

UofT AstroTours 2016-2018
Executive committee member

Misc. Event Volunteer 2015-2019
Public solar/night observing, Science Rendezvous street festival, Astro on Tap, etc.

Awards & Recognitions

NSERC Banting Fellowship 2021-2023
Center for Astrophysics | Harvard & Smithsonian \$140,000

NSERC Postgraduate Scholarship – Doctoral 2016-2019
Department of Astronomy & Astrophysics (UofT) \$63,000

Allen Yen Award for Excellence in Research 2018
Department of Astronomy & Astrophysics (UofT) \$1000

Ontario Graduate Scholarship 2015-2016
Department of Astronomy & Astrophysics (UofT) \$15,000

Lachlan Gilchrist Fellowship 2015-2019
Department of Astronomy & Astrophysics (UofT) \$5000 x 4

Center for Planetary Sciences Graduate Fellowship 2014-2016
Centre for Planetary Sciences \$10,000

NSERC Canadian Graduate Scholarship – Masters 2014-2015
Department of Astronomy & Astrophysics (UofT) \$17,500

Mary H. Beatty Scholarship 2014-2015
Department of Astronomy & Astrophysics (UofT) \$5000

Summer Undergraduate Research Program Award 2013
Dunlap Institute for Astronomy & Astrophysics \$9000

CITA Undergraduate Research Program Award 2012
Canadian Institute for Theoretical Astrophysics \$8000

Select Media Coverage

Two super-Earths around the red dwarf K2-18 UofT press release , iREx press release , CTV television interview	2017
Astronomers spy a nursery of baby planets Gemini observatory press release	2015
Who kicked a giant planet out of the solar system 4 billions years ago? We're looking at you Jupiter UofT press release	2015

Professional Development

Professional Positions

Journal Referee The Astronomical Journal Astronomy & Astrophysics Monthly Notices of the Royal Astronomical Society Proceedings of the National Academy of Sciences of the United States of America	2017-present
Telescope TAC Referee Gemini-North Canada France Hawaii Telescope (CFHT)	2020-present

Professional Development Programs

Mentoring Undergraduates: A workshop certificate series for scientist-mentors Harvard University	2020
Institute for Scientist and Engineer Educators: Professional Development Program UC Santa Cruz	2015
Certificate in Scientific Computing Scinet	2015
Teaching Assistant's Training Program University of Toronto	2015
Astronomical Instrumentation Summer School Dunlap Institute for Astronomy and Astrophysics	2013