

# Ryan E. Cloutier

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## Education

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### PhD in Astronomy & Astrophysics

*University of Toronto*

2014–2019

Supervisors: Kristen Menou (UofT) & René Doyon (UdeM)

### Honours Bachelor of Science with Distinction

*Physics & Astronomy, University of Toronto*

2009–2014

Supervisor: Ray Jayawardhana

## Doctoral Thesis

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**Title:** *Semi-parametric methods to aid in the detection and characterization of distant worlds around small stars*

**Supervisors:** Kristen Menou (UofT) & René Doyon (UdeM)

## Undergraduate Thesis

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**Title:** *A deep Spitzer survey of circumstellar disks in the young Double Cluster,  $\eta$  and  $\chi$  Persei* ([ApJ](#), 796, 127)

**Supervisor:** Ray Jayawardhana

## Research Experience

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Post Graduate.....

### MEarth Postdoc

*Center for Astrophysics (Harvard & Smithsonian)*

2019–present

Graduate.....

### PhD Candidate

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

2015–2019

### Graduate Research Courses

*Department of Astronomy & Astrophysics (UofT) and Centre for Planetary Sciences*

2014–2015

Undergraduate.....

### Undergraduate Researcher Positions

*Canadian Institute for Theoretical Astrophysics, Dunlap Institute for Astronomy & Astrophysics, and the Department of Astronomy & Astrophysics*

2012–2014

## First Author Refereed Publications

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**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. *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 survey of circumstellar disks in the young Double Cluster,  $\eta$  and  $\chi$  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](#)

## Contributing Author Refereed Publications

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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](#)

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](#)

Nelson, B., Ford, E., Buchner, J., **Cloutier, R.**, et al. *Quantifying the evidence for a planet in radial velocity data*, 2018, [AJ in press](#)

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, L26

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, L27

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., & Kaisler, D. *A deep Keck/NIRC2 search for thermal emission from planetary companions orbiting Fomalhaut*, 2013, [ApJL](#), 777, L6

## Preprints Under Review

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**Cloutier, R.**, Astudillo-Defru, N., Bonfils, X., et al. *Characterization of the L 98-59 multi-planetary system with HARPS: two confirmed terrestrial planets and a mass upper limit on the third*, 2019, [A&A submitted](#)

**Cloutier, R.** *The independent discovery of planet candidates around low mass stars and astrophysical false positives in the first two TESS sectors*, 2018, [AAS journals submitted](#)

## Non-Refereed Publications

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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

## Conference Proceedings

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Lin, M. K. & **Cloutier, R.** *Gravitational instability of planetary gaps and its effect on orbital migration*, 2014, [IAU Symposium](#), 299, 218

## Awards & Recognitions

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### NSERC Postgraduate Scholarship - Doctoral

Department of Astronomy & Astrophysics (UofT), \$63 000 2016-2019

### Allen Yen Award for Excellence in Research

Department of Astronomy & Astrophysics (UofT), \$1000 2018

### Ontario Graduate Scholarship

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

### Lachlan Gilchrist Fellowship

Department of Astronomy & Astrophysics (UofT), \$5000  $\times$  4 2015-2019

<b>School of Graduate Studies: Conference Travel Grant</b> <i>Department of Astronomy &amp; Astrophysics (UofT) and Centre for Planetary Sciences</i>	2015
<b>Centre for Planetary Sciences Graduate Fellowship</b> <i>Centre for Planetary Sciences, \$10 000</i>	2014-2016
<b>NSERC Canadian Graduate Scholarship - Master's</b> <i>Department of Astronomy &amp; Astrophysics (UofT), \$17 500</i>	2014-2015
<b>Mary H. Beatty Scholarship</b> <i>Department of Astronomy &amp; Astrophysics (UofT), \$5000</i>	2014-2015
<b>Summer Undergraduate Research Program Award</b> <i>Dunlap Institute for Astronomy &amp; Astrophysics (UofT), \$9000</i>	2013
<b>CITA Undergraduate Summer Research Award</b> <i>Canadian Institute for Theoretical Astrophysics, \$8000</i>	2012

## Conference Presentations

<b>Talks.....</b>	
<b>2nd Rencontres de Vietnam on Exoplanetary Science</b> <i>Discovering the Closest Habitable Worlds: Planet Detection Predictions for the SPIRou Legacy Survey-Planet Search</i>	<b>Quy Nhon, Vietnam</b> 2018
<b>CASCA 2017</b> <i>Canadians on the Ground Searching for the Closest Habitable Worlds</i>	<b>Edmonton, AB</b> 2017
<b>SPIRou Science Meeting</b> <i>Simulated Searches for Small Radial Velocity Planets Amid Stellar Activity</i>	<b>Nice, France</b> 2016
<b>CASCA 2016</b> <i>Detecting Potentially Habitable Earth-like Planets around Cool Stars with SPIRou</i>	<b>Winnipeg, MB</b> 2016
<b>Emerging Researchers in Exoplanet Science II</b> <i>Detecting Potentially Habitable Earth-like Planets around Cool Stars with SPIRou</i>	<b>Cornell U.</b> 2016
<b>Posters.....</b>	
<b>Exoplanets II</b> <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>	<b>Cambridge, UK</b> 2018
<b>Extremely Precise Radial Velocities III</b> <i>Planet detection predictions from simulations of the SPIRou Legacy Survey Planet Search</i>	<b>Penn State</b> 2017
<b>Extreme Solar Systems III</b> <i>The Rossiter-McLaughlin effect of planets transiting M-dwarfs and its impact on planet detection in radial velocity surveys</i>	<b>Waikoloa, HI</b> 2015
<b>CASCA 2015</b> <i>Could Jupiter have ejected a fifth giant planet from the solar system?</i>	<b>Hamilton, ON</b> 2015

**In the Spirit of Lyot**

*An adaptive, locally-optimized method for imaging and characterizing exoplanets and disks*

Montréal, QC

2015

**IAUS 299**

*Gravitational instability of planetary gaps and its effect on orbital migration*

Victoria, BC

2013

## Media Coverage

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**Two Super-Earths around the red dwarf K2-18**

*University of Toronto & Institute for Research on Exoplanets*  
[UofT press release](#), [iREx Press release](#), [CTV television interview](#)

December 2017

**Astronomers spy a nursery of baby exoplanets**

*Gemini Observatory*  
[Gemini Observatory press release](#)

November 2015

**Who kicked a giant planet out of the solar system 4 billions years ago? We're looking at you Jupiter**

*University of Toronto*  
[UofT press release](#)

October 2015

## Teaching & Mentoring

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### Undergraduate Teaching.....

**Teaching Assistant**

*AST221: Stars and Planets*

Fall 2017-2018

- Leading tutorial sessions
- Holding office hours

**Teaching Assistant**

*AST251: Life on Other Worlds*

Winter 2018-2019

- Creating course content
- Facilitating in-class discussions

**Teaching Assistant**

*AST121: The Origin and Evolution of the Universe*

Winter 2018

- Leading help sessions
- Grading exams and assignments

**Head Teaching Assistant**

*ASTA02 (UTSC): Beyond the Sun and Planets*

Winter 2017

**Head Teaching Assistant**

*ASTA01 (UTSC): The Sun and Planets*

Fall 2016

- Designing weekly tutorials
- Managing teaching assistants
- Giving guest lectures
- Holding office hours
- Leading tutorial sessions
- Managing student grades

### Teaching Assistant

*CSCC01 (UTSC): Introduction to Software Engineering*

*Fall 2016*

- Advising students on astronomy topics related to their course project
- Holding office hours
- Answering student emails

### Head Teaching Assistant

*AST 201: Star and Galaxies*

*Winter 2016*

### Head Teaching Assistant

*AST 101: The Sun and its Neighbours*

*Fall 2015*

- Designing weekly tutorials
- Managing teaching assistants
- Leading tutorial sessions
- Presenting planetarium shows

### Teaching Assistant

*AST 101: The Sun and its Neighbours*

*2014-2015, 2018*

### Teaching Assistant

*AST 201: Star and Galaxies*

*2014-2015*

- Conducting online office hours
- Grading assignments and exams
- Leading campus observing sessions

### Workshops.....

#### Workshop on Gaussian process regression in python

*Centre for Planetary Sciences*

*Fall 2016*

#### Introductory workshop for undergraduate STEM researchers

*Department of Astronomy & Astrophysics*

*Summer 2015*

#### Workshop for Ontario secondary school science teachers

*York University*

*Summer 2015*

### Student Mentoring.....

#### Mentoring incoming PhD students in their first-year

*2015-2016*

- Alysa Obertas (*University of British Columbia*)
- Adiv Paradise (*University of Minnesota*)

### Outreach

#### Select Public Lectures & Presentations.....

##### Classroom Q & A Session

*Christ the King Elementary School*

*Winter 2018*

##### AstroTour Public Lecture Series

*University of Toronto*

*Fall 2017*

*The Long Path Towards Finding Habitable Exo-Worlds*

**Graduate Speaker Series: Astronomy & Astrophysics***University of Toronto**The Long Path Towards Finding Habitable Exo-Worlds**Fall 2017***Mystical Landscapes Planetarium Show***Art Gallery of Ontario**Winter 2016***Public Lecture***North York Astronomical Association**Studying the Early Dynamical Evolution of the Solar System**Fall 2015***Outreach Positions**

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**UofT Planetarium***Planetarium Operator**2015–present***UofT AstroTours***Executive Committee Member**2015–2017***Professional Development**

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**Institute for Scientist and Engineer Educators:****Professional Development Program***Program Participant**2015***Scinet Certificate in Scientific Computing***Successfully Completed**2015***Teaching Assistant's Training Program:****Teaching Fundamentals Certificate***Successfully Completed**2015***Dunlap Institute Summer School:****Introduction to Astronomical Instrumentation***Successfully Completed**2013***Professional Positions**

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**Journal Referee***The Astronomical Journal, Astronomy & Astrophysics***Committee member:****'Topical Team in Space Explorations: Origins (Galaxies, Stars, & Planets)'***Canadian Space Agency*

I am part of the committee of Canadian astronomers tasked with evaluating the scientific benefits, challenges, and opportunities for Canadian participation in future science-based space missions. We advise the Canadian Space Agency on the ways in which we feel Canada should proceed in the field of astronomical discovery.