

# 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)

Expected completion date: Summer 2019

### Honours Bachelor of Science with Distinction

*Physics & Astronomy, University of Toronto*

2009–2014

Supervisor: Ray Jayawardhana

## Doctoral Thesis

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**Title (tentative):** *An application of Bayesian inference and Gaussian processes to the detection and characterization of distant worlds around nearby M dwarfs*

**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*

**Supervisor:** Ray Jayawardhana

## Research Experience

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Graduate.....

### PhD Candidate

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

2015–present

### 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.**, Doyon, R., Bouchy, F., Hébrard, G. *Quantifying the observational effort required for the radial velocity characterization of TESS planets*, 2018, [AJ](#) [accepted](#)

**Cloutier, R.** 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.** 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.** 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.** 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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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](#) [accepted](#)

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

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

## 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

## 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

## Awards & Recognitions

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<b>NSERC Postgraduate Scholarship - Doctoral</b> <i>Department of Astronomy &amp; Astrophysics (UofT), \$63 000</i>	2016-2019
<b>Allen Yen Award for Excellence in Research</b> <i>Department of Astronomy &amp; Astrophysics (UofT), \$1000</i>	2017
<b>Ontario Graduate Scholarship</b> <i>Department of Astronomy &amp; Astrophysics (UofT), \$15 000</i>	2015-2016
<b>Lachlan Gilchrist Fellowship</b> <i>Department of Astronomy &amp; Astrophysics (UofT), \$5000 × 3</i>	2015-2018
<b>School of Graduate Studies: Conference Travel Grant</b> <i>Department of Astronomy &amp; Astrophysics (UofT) and Centre for Planetary Sciences</i>	2015
<b>Dunlap Institute Travel Grant</b> <i>Dunlap Institute for Astronomy &amp; Astrophysics</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

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<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 Jitter</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>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
<b>In the Spirit of Lyot</b> <i>An adaptive, locally-optimized method for imaging and characterizing exoplanets and disks</i>	<b>Montréal, QC</b> 2015
<b>IAUS 299</b> <i>Gravitational instability of planetary gaps and its effect on orbital migration</i>	<b>Victoria, BC</b> 2013

## Media Coverage

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<b>Two Super-Earths around the red dwarf K2-18</b> <i>University of Toronto &amp; Institute for Research on Exoplanets</i> <a href="#">UofT press release</a> , <a href="#">iREx Press release</a> , <a href="#">CTV television interview</a>	December 2017
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## **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**

*AST251: Life on Other Worlds*

*Winter 2018*

- 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

#### **Teaching Assistant**

*AST221: Stars and Planets*

*Fall 2017*

- Leading tutorial sessions
- Holding office hours

#### **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*

I led a half-day practical workshop on Gaussian process regression in python for both graduate students and post-doctoral researchers as part of the series of *CPS Machine Learning Days*.

### Introductory workshop for undergraduate STEM researchers

*Department of Astronomy & Astrophysics*

*Summer 2015*

A two-day workshop for undergraduate student researchers enrolled in the Dunlap Institute's summer undergraduate research program. The content was focused on data-fitting/analysis and statistics for astronomers.

### Workshop for Ontario secondary school science teachers

*York University*

*Summer 2015*

A two-day workshop aimed at equipping teachers with the tools and skills to effectively teach astronomy using hands-on activities designed for Grade 9 and Grade 12 students.

## Student Mentoring.....

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

*2015-2016*

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

## Outreach

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

#### AstroTour Public Lecture Series

*University of Toronto*

*Fall 2017*

*The Long Paths Towards Finding Habitable Exo-Worlds*

#### Graduate Speaker Series: Astronomy & Astrophysics

*University of Toronto*

*Fall 2017*

*The Long Paths Towards Finding Habitable Exo-Worlds*

**Mystical Landscapes Planetarium Show***Art Gallery of Ontario**Winter 2016***Public Lecture***North York Astronomical Association**Fall 2015**Studying the Early Dynamical Evolution of the Solar System***UofT Planetarium***Planetarium Operator**2015–present***Volunteer Positions.....****UofT AstroTours***Executive Committee Member**2015–2017***Miscellaneous Outreach Events***Events Include:**2012–present*

- August 2017 Solar Eclipse
- Astronomy on Tap
- September 2016 Lunar Eclipse
- Science Unlimited Summer Camp
- Science Rendezvous Street Festival
- Keynote Lectures
- June 2012 Transit of Venus

**Professional Development**

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**Institute for Scientist and Engineer Educators:****Professional Development Program***Program Participant**2015*

A three-stage program on inquiry-based learning in undergraduate science including the design and execution of an authentic inquiry activity with undergraduate summer researchers.

**Scinet Certificate in Scientific Computing***Successfully Completed**2015*

Completion of the required computer science courses hosted at Scinet: Canada's largest supercomputer centre.

**Teaching Assistant's Training Program:****Teaching Fundamentals Certificate***Successfully Completed**2015*

Completion of the undergraduate teaching qualification program aimed at developing effective teaching strategies and to broaden our understanding of how undergraduate students typically learn.

**Dunlap Institute Summer School:****Introduction to Astronomical Instrumentation***Successfully Completed**2013*

Completion of the week-long lecture/practical series on optics, telescopes, and detectors.

## 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.